THE MAGAZINE OF PROPHETIC FICTION

WONDER Stories

December

HUGO GERNSBACK Editor

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By

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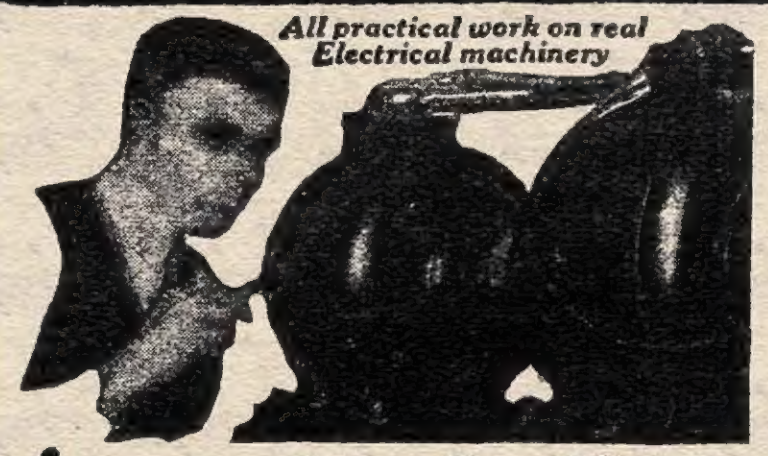

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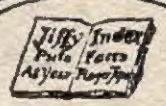

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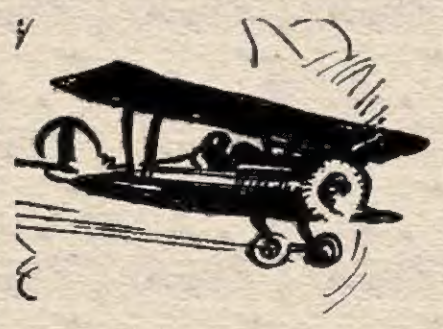

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VOLUME 2 No. 7

WONDER Stories

DECEMBER 1930

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HUGO GERNSBACK, *Editor-in-Chief*
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LIFE ON OTHER PLANETS

By HUGO GERNSBACK

TO the average science-fiction author, it is a foregone conclusion that life on other planets will be found similar to what we have on Earth. Writers talk about "human beings" found on the planets Mars or Venus, and these are usually assumed to be constituted the same as our own race.

Modern science scoffs at such notions; because the chances are less than one in a million for finding a type even remotely resembling the human race on any of the plants that could harbor life. There is little doubt, that practically none of the planets, with the exception of Venus and Mars, are able to support human life as we know it. Of the inner planets, only Venus has conditions analogous to those on Earth; while Mercury is certainly far too hot to support human life.

Mars, being a smaller body than the earth and not much larger than our Moon, presumably cooled down millions of years before the earth; hence the prevailing notion of science-fiction writers is that the intelligence of Martians, if there be any, must be far in advance of that of earthlings; while life on Venus, which has not as yet cooled down and has an almost impenetrable atmosphere, is probably still in the dinosaur stage.

Immediately the thought confronts us: if Mars is a logical abode for human life, and is so far in advance of the earth, then why have those "human beings" not made their presence known to us before?

Furthermore, science today concedes that interplanetary travel will probably come about during the next hundred years. If terrestrial beings, therefore, can make a trip to the Moon or to Mars it seems absurd to believe that the supposed Martians with a civilization millions of years in advance of human beings should not have done likewise during their evolution. If we are so far behind in the scale of evolution as compared to the Martians it would be more than presumptuous to believe that we can steal a march on them.

Logically, then, something is wrong with our reasoning. However a solution probably is not so difficult to find; and while everything in connection with this analysis must be based on pure guesswork one of the thoughts given below may contain the correct answer.

If Mars cooled down millions of years ago and evolved intelligent life such as we know it at that time, it is almost certain in that case that the Martians constructed space-fliers and visited the different planets. They could not then make a landing on Earth; for the simple reason that it probably had not cooled down or else it was in such a state of development that it could not support Martian life. The same would be the case with all of the other planets that they visited. So the chances are that the Martians had to return regretfully to their own planet and remain there until the race died out. In this case, any future earth travelers to Mars will find the remains of prehistoric Martian civilization.

On the other hand, Mars may contain intelligent life today, but not as we know it. It may perhaps take the form of insect life, and it is not even impossible that a race of insects, similar to our termites or ants, who can reason as well as we can, may have developed. If the race is blind, as are termites, of course they could not know about other planets; and would therefore make no attempt to visit us. All of this is possible. It would also support the theories of the Martian canals. Such Martians may have high intelligence, yet an intelligence that could not conceive a space-flier.

Third and last: evolution on Mars might have taken an entirely different line of development than on earth and it is not at all necessary that intelligent life should have developed on the planet. In this case, also, such life could not conceive of travelling to other worlds.

Any one of the three guesses may be right; and somewhere in between them we probably have the correct solution.

The Outpost on the Moon

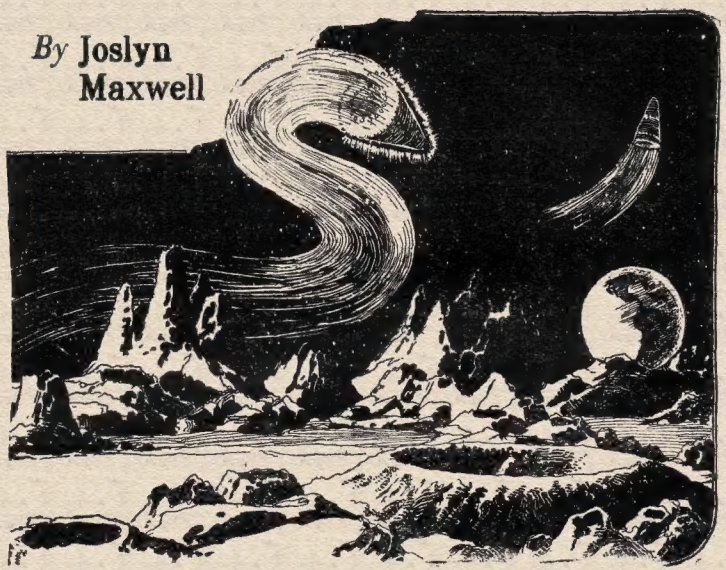
By **Joslyn Maxwell**

Illustrated by Paul

They believed themselves alone on the desolate Moon. But then the ray of the Outpost flashed its deadly challenge from the skies!

IT was late on a Sunday afternoon in early spring. Impelled by a feeling of restless loneliness, I had taken my little second-hand roadster for a drive, wandering at random over the highways, far from the city. The day had been deceivingly mild, and I had left my overcoat at home; now the lowering sun and a chilling breeze forced me to head for my little third-floor room in the heart of the great metropolis. The numbness of my fingers and toes influenced me to discard the caution that crowded roads and hurrying cars require; my foot rested more and more heavily on the accelerator, until I was passing the traffic wherever an opening in the line of closely-packed cars presented itself.

The falling darkness brought with it a light rain which rendered the highways increasingly slippery, and as the approaching cars turned on their headlights one by one, the driving became very difficult. The pace I was taking was the height of folly, but I was cold to the marrow, and reason was swept aside in my hurry to reach the warmth which awaited. I rushed heedlessly past a sign which read "SHARP CURVE" and swung over to the left-hand side of the road in order to pass the car ahead of me. Too late I saw the coupe rounding the curve



Fascinated I watched the machine climb into the pitiless sky. Langley muttered: "Twenty men and one fool pilot!"

toward me. I could not drop back into line, there was not time to pass the car ahead; I must leave the road or crash. Instantly I chose the former alternative, swung my wheel hard to the left and jammed on my brakes. There was a moment of jarring over rough earth, a violent shock, and I was lying on the seat behind the twisted steering wheel.

It was one of those freak wrecks. The car was completely demolished, yet I had escaped without a scratch. I found myself unable to get out of the machine, which had hit a telephone pole and was so bent out of shape as to be almost unrecognizable. Pieces of glass lay all about me, yet not one had touched my skin. In fact, the only injury I could discover outside of a severe shaking-up was a slight bruise on my left elbow.

While I was debating the best method of escape, I heard voices close to the car, and presently a head appeared through an opening in the wreckage of the top.

"Are you alive?" the owner of the head asked excitedly, and a bit timidly.

"Quite all right, thanks, but I can't get out," I replied. The head disappeared, and I heard a murmur of voices; people passing the news along to the constantly growing crowd:—"he's all right"—"nobody's hurt". Presently the man who had first spoken reappeared with a fence rail which he used as a crow-bar, prying open a hole large enough for me to get through, albeit with some damage to my clothes.

I found myself in the midst of a circle of curious passers-by, most of whom, to judge by their expressions, thought that I had got no more than I deserved. Perhaps they were right, but I hoped that at least one of them would forget his prejudice to the extent of offering me a ride back to the city. It was in thus looking over the crowd that my glance fell on a familiar figure. I recognized him almost immediately as Barton Wiley, a prominent physicist, who during my attendance at the City College had been a young instructor. That institution had now grown to the proportions of a good-sized university, though still retaining its

original name; and with its rise Wiley had attained considerable fame through his experiments in electricity. He was now Professor of Physics. After thanking the man who had liberated me, I spoke to him.

"Do you remember me, Professor Wiley? George Marland—I was a graduate student at the City College nine years ago."

"Yes, indeed, Marland," he replied. "So it was you! Apparently the laws of man do not appeal to you as much as those of nature!" He laughed. "May I give you a ride back to town? I see you were in a bit of a hurry to get there." He indicated with a wave of his hand one of the autos parked alongside the road, and noting gratefully that it was a closed car, I accepted.

We climbed in, and he headed the car for the city. On passing through a nearby village, I made arrangements with the local garage-owner to collect such of my car as was worth salvaging and dispose of it to a junkdealer for what it would bring.

As we proceeded toward the city, there was little conversation between us, the professor being intent on watching the road, and I had an opportunity to reflect on my acquaintance with him in the past. During my graduate work, I had come in contact with him often, and a friendship had grown up between us. He had urged me to accept a position as instructor at the college, but I had preferred to try my luck in the commercial world. He had remained to watch the growth of the College; and after an unsuccessful attempt to find work in the laboratory of some large corporation, I had drifted into the newspaper business.

My chief success in that line had been the writing of near-scientific articles for the Sunday supplements; but I had wearied of the job, and tried my hand at one thing and another. The intervening nine years had passed quickly, and found me no nearer to fame and fortune than when I had graduated. Perhaps if I had followed his advice I should now be in a position comparable to his own. He was highly regarded in scientific circles for his research work in the field of electricity, and had made less known, though perhaps even more startling discoveries regarding the structure of the atom. Of his methods I knew little, but his results had often been published.

He had succeeded in repeating the experiments of Rutherford, in which atoms of nitrogen were broken down into helium and hydrogen; and it was rumored that he was working on the ever-fascinating problem of getting energy out of atoms. I welcomed an opportunity to talk over some of these matters with him, as presented by our present accidental meeting.

AS though my thoughts had suggested themselves to him, the professor turned to me.

ONE of the greatest arguments in favor of interplanetary travel comes from the lack of ability of our scientists to conduct complete studies of the heavens from the earth. The same blanket of atmosphere that protects us from the cold of outer space and deadly rays, also serves as a blanket against our telescopes and other instruments of observation.

What scientists would consider as ideal would be a place of observation with no air or dust whatever separating them from the heavens. Then the sciences of astronomy and physics would get a real impetus from the discoveries that would follow.

An outpost on the moon would do all these things. And if the earth were menaced by an unknown yet terrible danger from space, such an outpost would be not only a plaything of science but a vital necessity to our race. Mr. Maxwell develops this theme in an exciting story of adventure and mystery that will take us to the furthest limits of the solar system.

"How about having dinner with me?" he asked. "Why not spend the evening? You must have had some experiences during the years since you left the College that would interest a man like myself, who never gets out of the laboratory except to teach classes."

I told him that I would be delighted, but that I was much more anxious to hear more of his work than to talk of my own fruitless efforts.

Accordingly we dined at a neat little restaurant close to the City College, near which he maintained his residence. Our conversation ran to pleasantries and topics of current public interest; by common consent we deferred deeper subjects until we had finished the meal.

When we reached the professor's comfortable little apartment, and had lighted cigarettes and settled ourselves comfortably, I again broached the subject of his work. He said nothing for a moment, apparently lost in reflection.

He looked much the same as when I had seen him conducting classes; a tall man, of rather slight build, with regular features too large to be called handsome. His hair, now graying slightly, was, as always, perfectly combed; and in spite of his shell-rimmed spectacles and slight stoop, his appearance suggested rather the distinguished man of leisure than the scholar.

JOSLYN MAXWELL

I was startled out of my contemplations by his voice, mild and slow, yet with great carrying power.

"I understand, Marland, that you are connected with a news agency, and if I remember rightly you have been the author of a number of articles purporting to describe the discoveries of research workers."

I nodded assent.

He continued, "In that case I should ordinarily have nothing to say. But since I take it that your question has been prompted more by a personal interest than by a desire for news, and provided that you give me your word that you will publish nothing I may tell you without my express permission, I shall be glad to talk over some of my experiments with you."

I assured him that whatever he said would be held as strictly confidential, and that my interest was purely that of a student of science in the work of a successful researcher. He smiled.

"I can hardly be called successful," he said. "For the most part I have merely done what others have done before me. There was considerable comment in scientific journals, I believe, over my attempts to change the structure of the nitrogen atom, which were in part successful. As you doubtless recall, the atom consists of a number of charges of positive and negative electrcity. These normally neutralize each other; but occasionally a change in the number of negative charges, or electrons, as they are called, takes place in the outer limits of the atom; one or more electrons may be picked up or lost, and the atom becomes an ion. This is of course familiar to you, but I am merely restating it in order that you may be prepared for what I am about to say.

"With the single exception of experiments like those I have recently performed, no one has been able to redistribute the protons, or positive charges. Of course, in the very heavy metals, such as uranium, radium, and the whole class of radioactive elements, this goes on spontaneously; the nuclei of helium atoms being liberated in the form of alpha-rays, and electrons in the beta-rays. But to do it artificially to any of the other elements, or to even speed up the spontaneous processes of radioactivity, is at present impossible."

I nodded, leaning forward interestedly.

"Even were this accomplished, it would not necessarily result in the liberation of energy. That is not the end to which my efforts have been directed, contrary to certain reports. The aim of the modern alchemist—that of transmuting one element into another, such as mercury into gold—has been my field. As I say, I have as yet been unsuccessful.

"But let us suppose that one could, at his desire, separate the protons and electrons of an atom, and recombine them. It would be possible for such a person to make at will any element or chemical compound he wished, from any other; or perhaps to create a substance as yet unknown to us—a metal whose atomic weight was greater than that of uranium, for example. Such an element would probably be highly radioactive, if we may judge from the behavior of those radioactive substances already known."

"You mean," I asked, "that it would be possible in that manner to liberate the latent energy of the atom?"

"No," he returned, "that is not what I had in mind. But a substance so unbalanced in structure might easily be a storage battery, so to speak, of vast quantities of energy, which could be built up slowly and liberated quickly."

Less Than Nothing!

HE was silent for a moment, and I took the opportunity to ask, "What of your experiments in electricity?"

"That has been more of a hobby with me than a subject of real research," he replied. "The two fields are closely related, however. We know that electric charges are merely unbalanced proportions of electrons and protons, and that an electric current is nothing more than a stream of moving electrons." Again he paused for a moment, looking at me intently.

"Marland," he said, "If I remember rightly, you once remarked on the similarity of the behavior of astronomical bodies to that of electric charges of opposite sign, and asked whether it might not be possible to discover some sort of 'negative' gravity, which would repel, and be repelled by, matter as we know it. I answered you, I believe, by saying that the resemblance was merely superficial; and to prove my point I called your attention to the fact that when two charged bodies approach one another there is a redistribution of the electrons, which repel each other and consequently are driven to the far sides of their respective bodies; while no such redistribution takes place when two bodies are placed each within the gravitational field of the other. Since our discussion Einstein has brought out his theory on the interchangeability of gravity and electricity; and I have found, in the laboratory, definite corroboration of his views!"

He stopped, but I remained silent, knowing that he had not yet finished. Presently he resumed: "We believe that an atom—say of hydrogen, since it's the simplest of all—consists of a positive charge at the center, and a moving negative charge. We've assigned a pretty definite size and weight to the negative charge—the electron. But the hydrogen atom weighs nearly two thousand times as much as this electron, so we say that the difference must be in the proton; and to make it agree with our theories we say it has the same charge as the electron, but is much smaller. I know it sounds rather contradictory to say that the smaller body has the greater weight, but that's all covered in the electromagnetic theory of mass, some of which has been developed since your time.

"I fell to speculating on what would happen if the negative charge could be made smaller, and therefore heavier, or the proton larger and lighter. I devised some experiments along that line, and with rather startling results, I assure you. For when I succeeded in exchanging the weight of the proton and the electron I found that I had actually created a 'negative element'—one which weighed less than nothing! Continuing along this line, I made another curious discovery—that when a proton and an electron of the *same* weight are combined, their weight disappears entirely (though not their inertia); and furthermore, they

absorb the force of gravity, so that matter made up of these charges, which I have called 'equi-protons' and 'equi-electrons', *weighs nothing, and is a perfect insulator against gravity!*"

"Like Cavorite!" I exclaimed. H. G. Wells' famous story, "The First Man in the Moon," flashed into my mind. Here was the very sort of thing that had enabled his heroes to make their voyage to our satellite. Why shouldn't his dream become a reality?

"No, not Cavorite." Professor Wiley's amused face brought me back to earth with a flush. "Wells' imaginary compound, if you will remember, was made into shutters fastened on the outside of his glass space-car. But, unfortunately, you can't make a gas into shutters. And that is what I have been experimenting with—hydrogen gas!"

I experience a feeling of bitter disappointment. Stories of trips through interplanetary space, independent of the attraction of the heavenly bodies as well as that of the earth, had always excited my imagination; and in the brief flight of fancy which I had just experienced, I had hoped to actually witness the accomplishment of this dream.

At length my thoughts returned to Wiley's remarks. I was curious to know something of the method by which he accomplished this wonderful thing. The explanation which he gave I shall not reproduce in detail, for many reasons; primarily because the process is not protected by patent; and also because the mathematics involved would be meaningless to the average reader. Let it suffice, then, that the procedure consisted in passing hydrogen ions through electric and magnetic fields of such intensity as had not been produced anywhere else on earth; and that, in the end, the dimensions of the proton were expanded to those of the electron. Then, their charges being equal and opposite, the respective weights became likewise. Wiley offered no explanation of the absorption of the force of gravity; he confessed frankly that it was beyond his ability to explain at present.

WHEN he had finished, speaking, I asked him whether he had tried the process on any substance other than hydrogen-ions. He replied that he didn't believe it would work with any others, but that he intended experimenting with helium shortly.

"You see," he explained, "there are electrons and protons bound together in the nucleus of the atom; and you can't very well affect one without affecting the others." However, he said, he proposed to run the test on a number of common elements, including some of the lighter solids. In response to my eager questions, he admitted that should one of these last behave in the same manner as hydrogen he would indeed have a substance similar to Cavorite.

"But," said Wiley, "If it should turn out, I'd have to keep it dark, else some idiot would want to start right off on a trip to Mars. Of course, no one with sense enough to know the danger would think of it; and it would take a man who realizes the danger and who understands astronomy to carry it through successfully. Yet there's always some fool ready to try it. He'd undoubtedly be lost, thereby giving the hopes of those who might be competent a severe setback."

"Not necessarily," I exclaimed. "Why, I'd be glad to undertake the trip. I've studied astronomy enough to plot my course."

"You!" exclaimed Wiley.

"And why not?" I demanded. "After all, I've been enough of a failure at everything else to deserve a chance at success in this. And I've no connections, no property—nothing at all to tie me here to the earth."

Wiley regarded me steadily for perhaps a minute, before speaking.

"Well," he said at length, "we've let our fancies run away with us, since the success of the vital element hasn't been tested yet. Our gravitation-screen is merely an idea so far." This was obviously intended to discourage me and divert my attention from the question of a trans-ethereal flight. His next words, however, assured me that he expected success.

"If I were you," he said, "I should let the matter drop. In time it will be accomplished, but one is foolhardy to anticipate developments. The first aviator didn't set

off for Paris; he left that to a man better trained, and with the equipment and experience developed through a quarter of a century."

"True enough," I answered. "The Wright Brothers didn't set off for Paris; but they flew as far as they could. A flight to Mars would perhaps be too much at present; but why not a trip to the moon—only a two-hundredth part of the distance?"

"What would be the object of that?" asked Wiley.

"What was the object of the Wrights in flying their few miles?" I retorted. "To show the world that it could be done, and to encourage others to try it."

"Perhaps you're right," he said slowly. "But I must have your promise to say absolutely nothing of what we have discussed tonight."

—"Given—on condition that you keep me informed of your progress in your experiments," I replied.

We agreed, and I departed exultantly, for I knew from his manner that he would be successful if he made the attempt to produce the gravity-resisting solid; and I knew also that he would never allow the opportunity for such a discovery to escape him.

But my thoughts were turned away from Wiley and his experiments in an unforeseen manner. When I reached my residence I found a call from the chief of my news bureau. There were reports that China had declared war on Russia; the Washington office was short-handed, and I was ordered to catch the first train there to cover developments. I hastily packed a suitcase, caught the midnight train, and reported for duty shortly before nine the next morning.

During the next two weeks I found plenty to occupy my mind. I was new at the task of reporting political news; consequently I spent hours where more experienced men would have taken minutes, searching in vain through the dark halls and airy rooms of the big State, War, and Navy building for someone with both authority and inclination to speak; attending conferences at the White House in company with a dozen or more representatives of rival press agencies; or waiting in the ante-room of the State Department's press bureau for a mimeographed "handout" radioed from the Consul General at Shanghai.

News is no respecter of the clock, and coming as it did from the other side of the world, it happened as often as not that the most important developments were reported to the national capital in the small hours of the morning. Time and again my slumber was broken by phone calls from the indefatigable chief of the Press Bureau, informing me that a statement was being prepared.

It was after such a night, spent in trying to beat rival reporters to the wire, that I returned to my room and found a letter bearing Wiley's name above the return address. I tore it open and read it at a glance:

"Dear Marland:

"After trying unsuccessfully several times to reach you by phone, I was informed by your office that you were in Washington covering the Russo-Chinese outbreak and were apt to be there for some time. I had hoped to see you soon; but I trust you will communicate with me immediately upon your return.

"Referring to our conversation of the other night, if you will come to my laboratory at your earliest convenience I may be able to show you something of interest.

"Cordially,

"Barton Wiley."

He had succeeded!

CHAPTER II.

Success!

WILEY'S letter filled me with an immense impatience to see him at once. A leave of absence from my duties at this time was out of the question; the only remaining alternative was to resign. I gave notice, and waited with what patience I could muster until a man had been found to fill my place, meanwhile notifying Wiley of my intentions.

Upon being relieved from duty, I caught the first train, and hastened to the laboratories of the City College. I found my friend making preparations for another of his innumerable experiments, but on seeing me he dropped everything and, dismissing his assistant, led me to a corner of the room

where there lay a heavy box, apparently fastened firmly to the floor. I could feel a strong draft of air rising about it, and as he unlocked it, the lid flew back apparently of its own volition. Observing my surprise, Wiley explained these phenomena.

"As you probably surmised," he said, "I have been successful. I have in this box a plate which is perfectly impervious to the force of gravity. Nothing above it has any weight; hence the vertical air-current and the lightness of the lid."

He reached into the box and brought out what appeared to be a square of blackness, and laid it on the table. Do not misunderstand me; it did not in the least resemble a piece of black wood or metal; there was no reflected gloss, no appearance of solidity; it was as though I was looking into a bottomless hole in the laboratory table, and the effect was heightened by the strong upward draft. I commented on this, and again Wiley satisfied my curiosity with a simple explanation.

"The color of this substance differs from what we ordinarily refer to as "black' in that it absorbs practically all of the light which strikes it," he said. "Ordinarily black paint reflects enough light to make it visible, but the human eye is unable to detect any reflection from this. There is no visible surface, and therefore nothing from which to judge its location. The effect is the same as that of looking into an unlighted hole."

I was struck by another thought. "If the air above it has no weight," I said, "won't it escape into space?"

"I hardly think so," he answered. "This plate is six inches square, and removes the influence of gravity from a column that large directly over it. However, as the air arises, it expands equally in all directions, and the greater part by far is forced out over the ground again. There are probably strong currents high in the atmosphere which blow the rising air out of line with this gravity-resister. Then, too, think what an infinitesimal portion of the globe it covers; all the rest is free to attract the air after it gets a little way up."

"One more question," I said. "Why doesn't the plate itself fly upward?"

"I took the precaution to cement it to a sheet of iron, on the under side," said Wiley.

For a few moments he demonstrated the peculiar properties of his discovery; holding objects above it and allowing them to rise until stopped by the ceiling, where they remained until he slid the black plate from beneath them, or juggling them up and down by passing it back and forth, allowing the force of gravity to act intermittently. At length he returned the plate to its box, pushed down the lid and fastened it. Then he faced me.

"Marland," he said gravely, "think of the possibilities of this discovery as applied to aviation." He paused to let his words take effect; then he continued: "Suppose an airplane were equipped with enough of this material to make its weight practically nothing. The wings could be reduced to a size sufficient to direct its flight upward or downward, such as the ailerons at present employed. The air resistance would be cut down enormously and the motive power could be increased almost indefinitely, since the weight of the engine would cut no figure. Think of the great air liners it will be possible to build! Ships carrying thousands of passengers, tons of freight, around the world—anywhere!"

It was a glowing picture he painted. Carried away by his own thoughts, he enlarged on the idea.

"A plane could rise high into the thin atmosphere many miles above the earth, and there attain such a speed as would carry it across the Pacific in a few hours!"

These words brought forward again the idea which had lingered in my mind since our previous talk.

"What's to prevent such a plane heading straight up and flying off through space to the moon?" I asked. Wiley's face became grave, and he considered for some time before answering.

"Nothing," he said at length. "I could depend on you to think of that again," with a smile. "But there are a few practical objections to the idea. Suppose you did head straight up and leave the earth; how

would you steer so that you would land on the moon?"

"A matter of starting in the right direction," I replied. "After leaving the atmosphere the plane would continue in a straight line until stopped by some other force."

"Such as collision with the surface of the moon?" asked Wiley.

"Exactly," I replied, "though the contact should not be violent enough to cause a wreck."

"And to avoid a wreck you must either slow down before landing or start at a low enough speed so that a direct collision would not injure the plane. I am not an astronomer, but I do know that the moon's atmosphere, if any, is so thin as to go undetected by any means known yet. Too thin to slow down in, at any rate. If you adopt the other alternative—start at a speed of, say, five miles an hour—how long would it take you to make the journey?"

"About 48,000 hours; that is, 2,000 days, or roughly five and a half years," I said, calculating mentally.

"RATHER a tedious journey," commented Wiley. "And when you had landed, how would you return, with no atmosphere to start in?" He smiled. "Better stick to the earth, Marland, and leave your interstellar voyages to the future."

"But we haven't exhausted the possibilities yet," I protested. "There are other means of motive power than a gasoline engine and screw-propeller. For instance, suppose the plane were built like a rocket, with discharging explosives to drive it. It would be possible to start and stop in a vacuum then."*

"Perhaps so," agreed Wiley. "It would require a considerable amount of gunpowder to give you much initial velocity, though, and the same amount to stop. Then to go back you would require still more."

"Only half as much as you think," I replied. "To start off, it would only be necessary to interpose the gravity-screen between the earth and yourself; the centrifugal force of the earth's rotation would do the rest. At the equator you could start off with a velocity of a thousand miles an hour, and less as you liked from a higher latitude. Returning with the same velocity you need only turn the gravity screen toward the earth, and the atmosphere would soon stop you. The discharge would be necessary only on the moon."

"Right again," said Wiley. "You know, Marland, you're beginning to convince me of the practicability of this idea of yours. The other factors are not insurmountable; light, heat, air, and food. They've been worked out by submarine builders." He arose and paced the floor nervously, then faced me.

"Do you really mean you'd care to try try it?" he demanded.

"Wiley," I said, "there'd be no better man for the job. I've been a failure so far. I've nobody to care what becomes of me if I shouldn't come back, and it would be a great help to science if I succeed. I'll start the instant you give your consent."

He shook his head doubtfully.

"I couldn't let the credit go to someone outside the College," he said. My hopes fell as he continued, "After all I made the trip possible, and I ought to take charge of it." He regarded me quizzically. "But I'll need an assistant who knows astronomy. I can make a job for you in the Physics Department; Cosmic Research, shall we call it? You'd have to teach a couple of classes. What do you say?"

"Accepted!" I exclaimed. "I could ask nothing better. When do we start?"

"We start, if ever, when I have convinced the Trustees of the College of the advisability of financing us," was the reply. "We can't build our machine on knowledge and hopes. But your first duties will be to make complete specifications for the machine and a map of our course. I haven't the time, and your knowledge of Astronomy is much better than mine. I'll leave it to you."

Wiley had put it up to me squarely to get the plan into presentable form, and I

*Newton's third law of motion states: "To every action there is an equal and contrary reaction, or the two actions are equal and opposite." The small mass and great velocity of the discharged explosive are equal to the larger mass and smaller velocity of the rocket.

resolved to do my utmost. The first problem was to determine the course we must take in order to reach the moon. To the layman it might appear to be a simple matter of waiting until our satellite was directly overhead and starting off, leaving the rest to gravitation. But such a course would probably have ended in our being reduced to gaseous elements in the sun, or freezing and starvation as we drifted further and further away from the solar system.

The centrifugal force which would set us free would send us in a direction tangent to the earth's surface. To an observer beneath us at the moment of our departure we would appear to rise nearly vertically for a time, drifting more and more to the west; and if he were to follow us with a telescope we would disappear below the western horizon, or "set", as does the sun. Twenty-four hours after our departure he would find us almost due east of himself, several thousand miles away.

Supposing that we started from our own latitudes, our initial velocity would be approximately seven hundred miles per hour. Our course would be bent slightly upwards —that is, away from the earth's surface— by the buoyant force of the atmosphere on our weightless car, but once free of the air our course would be a straight line. My problem, then, was to determine our ultimate direction, and time our departure so that we would meet the moon at whatever point on its orbit we might choose. The journey would require a little over fourteen days.

Patient Plans

I NEXT turned my mind to the design of the car in which we would travel. The first consideration was its shape. The gravity screen was difficult and expensive to make, so that the smallest surface possible was desirable. This of course suggested a sphere with its surface covered by the gravity-opaque substance. It was necessary to remove the screen at times, in order to land; hence the screen was to be divided into hemispheres, one of which could be slipped above the other.

A second requisite was that the hull of the car must be strong enough to withstand the shock of the innumerable tiny meteorites which fall with great velocity near the earth, and are destroyed by the atmosphere, but which would strike our craft when free of the protecting air. High-grade armor steel seemed suitable.

Next, we must have a means of swinging the moving half of the gravity screen from beneath us, such as an electric motor; and we must have light and heat. Storage batteries seemed desirable as a source of energy, as their weight was no objection. Then there must be a means of keeping the air in the car breathable. This could be accomplished by driving the stale air through limewater, and heating potassium chlorate to liberate its oxygen from combination.

Then there must be the means of stopping. By storing hydrogen and oxygen at high pressure and burning them in the right proportions, steam under tremendous pressure would be generated; and this, directed as desired by nozzles, would stop the car by the recoil of its departure. I determined on hydrogen and oxygen as an explosive mixture because of the convenience of storing large quantities and the relatively great energy of their combustion. Last of all there was the matter of storing sufficient food and water to last us during the trip. In addition to the four weeks in making the journey, we would spend some time in exploring the surface of the moon, and the return.

I had entered on my duties as assistant instructor, which consisted of taking charge of a few laboratory and recitation classes each week. The remainder of my time was spent in the physics laboratories, surrounded by drawing instruments, reference books, and reams of paper with calculations, drawing up plans and specifications, mapping our course and compiling data to present to the Board of Trustees. During several weeks I scarcely ate or slept, and when at length the task was finished, I showed the results of my work to Wiley with considerable satisfaction.

In their final form, the plans called for a steel shell twenty-five feet in diameter, which was to be lined with asbestos. Inside this was to be a second shell, with the space between the two allotted to the storage of the hydrogen and oxygen. The inner shell was also to be lined with asbestos, and have fastened to it the storage batteries and tanks of water, compressed air and purifying chemicals. Next, inside these, were to be cupboards for storing food and such equipment as we took along.

All this occupied a considerable portion of the interior of the shell, leaving us but a small space in which to live, but with the idea of economy I had purposely made the machine as small as possible. I had included in my plans a sort of "diving apparatus" with which to leave the car through an air-lock which provided the only means of entrance and exit. In the outer door of the air-lock was the one glass window, or port-hole, I had allowed. More than this I had not deemed advisable because of the possibility of their being broken by meteorites. It could be covered with a steel cap and need be exposed only for the time necessary to make observations. The inner door of the air-lock could be left open when the port-hole was in use.

Wiley went over my drawings carefully, reading the specifications and estimates.

"You certainly seem to have considered everything," he remarked. "I see you're quite an astronomer; your explanation of our course would be clear to anyone. These data will help me to put the proposition up to the Trustees in a convincing manner." He put the sheaf of papers and drawings in his desk, adding: "From now on it's up to me to put it across. I've been talking to the head of the Physics Department, Dr. Willson, and he'll back us. Heftner can't see it at all, but you know how these old-time astronomers are. He predicts that we'll land on the sun, if we ever leave the earth, and he's refused to give us any help in the matter. But we don't need him, as Radner has agreed to check your calculations, if necessary, and give us any information we want regarding the position of the planets."

"They're allowed for," I replied, "though I'd be glad to have him go over my figures. But do you think it's a good idea to talk about this plan to so many people? Don't you think it would be better to keep it a secret, at least until we're reasonably sure of success?"

"I haven't mentioned it to anyone outside the faculty," replied Wiley, "and I meant to caution you not to. By all means we must keep it dark. Too many men have become the laughing stock of the world over their fruitless attempts to plan to do what we plan, and publicity would only bring ridicule."

During the ensuing days I waited with considerable impatience for the meeting of the Board of Trustees. I devised, in my mind, a thousand plans for financing our trip independently should the Board turn us down, mentally resorting even to speculation in the stock market and bank robbery; but the more I thought on the matter, the more obvious was the conclusion that we must be backed by the College or not at all. You may imagine with what eagerness I waited for news from Wiley when, on the second of April, he went before the Board of Trustees with our plan. During my morning quiz I found my thoughts miles away from the classroom, and twice caught myself marking "A" opposite the name of a student who reported himself unprepared. At length I dismissed the class early, and waited in the office of the Physics Department for a phone call from Wiley.

It was an hour before the bell rang; but even as Wiley spoke my name, I knew the outcome.

"Marland, *we win!*" And he banged up the receiver.

CHAPTER III.

First Flights

OF THE bustle and feverish activity of the next few weeks I remember few details. Wiley and I spent most of our time in the laboratory making the gravity screen, as we would not trust the precious formula to anyone else. The contract for the outer

steel was let; and arriving in due time it was subjected to every test the Physics Department could devise. Occasionally Wiley or I took time to supervise some detail of the installation of tanks, batteries and such equipment. There were many delays. A whole shipment of plates for the batteries was defective and had to be replaced; the cement which we had ordered to fasten together the plates of the gravity-screen was lost in transit; and the plate glass port-hole had to be trimmed down to fit the frame. An unforeseen difficulty, due to our lack of knowledge of diving apparatus, arose when we tested out the special suits in a vacuum chamber. They enabled us to breathe as we had expected; but the pressure of nearly fifteen pounds per square inch stiffened out the fabric so that we could not move. the difficulty being solved by placing metal joints at the shoulders, hips, elbows and knees.

The school year was over, and it was early summer, before the car was completely assembled. Neither Wiley nor I taught any classes in the summer school, so our entire time was devoted to the examining and testing of the car. I was impatient to begin our trip at once, but Wiley more prudently planned to make a series of test trips, cruising above the atmosphere for awhile in order to determine the behavior of the ship while actually free in space, and to make observations on the number and size of meteorites encountered.

Our first trial trip nearly resulted in disaster. The car had been carried to a field outside of town, and after a final inspection we entered, closed the air-lock and put the gravity screen in position. The sensations were exactly opposite to what one might expect after having ridden in high-speed elevators, for with the force of gravity suddenly cut off from beneath us we felt as though we were dropping rapidly an immense distance, there being only the slight acceleration caused by the buoyancy of the car to hold us to the floor.

We promptly opened the port-hole and found ourselves already some distance above the ground (as we could tell only by the proximity of the clouds, since our view below was cut off). We quickly passed through these, and by the blackening of the sky above us we realized that the air was becoming extremely thin. Soon some of the brighter stars were visible. Almost overhead I recognized Capella, the twinkling diamond of our winter nights, and well to the east, nearly lost in the sun's glare, was Mercury, the most elusive of the planets, whom many die without seeing.

As the diffusion of light by the air grew less and less the sky was soon studded with stars, and by reference to our watches we saw that we were nearing the upper limits of the atmosphere. Presently we began to hear occasional light taps on the shell of the car—falling meteorites of minute dimensions which had not yet penetrated the protecting blanket of air far enough to be burned by the heat of their passage. We closed the cover of the port-hole for safety and listened to the slowly increasing patter of these wandering particles of metal and volcanic rock. Occasionally one, louder than the rest, denoted our collision with a stone of appreciable dimensions, and once a loud crack and noticeable jolt accompanied the fall of a fair-sized meteorite.

At length Wiley decided that we need go no further from the earth, and reached for the switch which rotated the moving half of the gravity-screen from its position beneath us. Hardly had he made the contact, however, when the car lurched violently to one side and capsized, throwing us into a heap with all the movable objects in the car in one corner.

For a moment I thought we had been struck by a large meteor, but presently I realized what had happened. Imagine that you have a ball balanced on one finger. If you move your finger to one side, the ball promptly tips to the other side and falls off. That was what had happened to us. The lower half of our spherical screen had been moved, and the moment the force of gravity took hold of the edge of the car, it drew that side down sharply, upsetting the car and turning everything in it upside down. We were diving headfirst toward the earth.

I scarcely had time to be grateful that there were some fifty miles between us and

the ground when a new danger presented itself. The interior of the car was becoming uncomfortably warm, due to the friction of the air as we passed through it with increasing speed. The mental picture of ourselves landing on the earth reduced to cinders in the midst of a blazing steel meteor galvanized me into action. I reached for the switch with the idea of turning the gravity screen into position, but the futility of that soon became apparent. The shock of the upset must have jammed it open. Then I remembered the tanks of hydrogen and oxygen. Shutting off the current from the motors which controlled the gravity screen, I reached for the valves, turned the gas into the nozzles beneath us and shot an electric spark across them. There was a sharp report, a roar, and I was again precipitated to the bottom of the car as the recoil of the burning gases checked our fall.

We were saved from destruction by falling or by incineration, but there was still a difficulty. Where, and on what, would we land? I could see only one way to answer this question. After we had dropped slowly for several miles, I shut off the gas and opened the porthole for a look. All I could see, however, was a bank of clouds brilliantly illuminated by the sun. I must wait until we were nearer the ground. According I again opened the gas valves, braced myself and touched the igniting button.

WE fell several miles more, slowly passing through rarer layers of the atmosphere, until I estimated we were close enough so that I could see where we were. Moving as quickly as possible I cut off the gas and opened the porthole. By pressing my face close to the glass I could see the city several miles to the east, with the silver thread of the river winding close to it. This offered an idea; if I could maneuver the car to a position over the water and drop into it there would be little danger. I closed the porthole and started the gas, this time from the nozzles to the west as well as below me.

My next observation showed that we were nearly over the river and about a mile high. I allowed the car to descend slowly until it was only a few feet above the water, then shut off the gas entirely. There was a shock as we hit the surface of the river; then, after all motion had subsided I opened the porthole once more, and the darkness outside told me that we were resting on the bottom.

During our headlong descent I had not had time for more than a glance at Wiley. He had been lying amidst the pile of loose objects which had tumbled about the car on the way down, quite unconscious. I found a large bruise on the back of his head, but apparently he was only stunned, as his respiration and heart action were normal. I found some water in one of the tanks and bathed his head. Presently he came around and sat up, rather unsteadily.

"Still alive, at any rate," he observed dryly. "What happened? Did we hit a meteor?"

I explained briefly. He nodded, and made a hastly inspection. Apparently satisfied, he turned to the switchboard again with a warning to hang on. By means of the gas jets he again capsized the car so that the gravity screen was beneath us, and with the aid of more gas we burst through the surface of the water and into the sunlight.

We effected a safe landing on the field, to the surprise of the few mechanics and assistants waiting for us, who had witnessed our drop into the river; and that night found us again in the laboratories of the College, bruised and shaken but still full of impatience to undertake the journey.

Before making any further trips it was apparent that we must change the design of the gravity screen. The simplest solution appeared to be that of making it in the form of four quarter-spherical surfaces mounted on common bearings, so that they might be manipulated to expose any portion of the car in any direction. They could now be moved apart separately from the lowest portion of the car so as to expose equal portions on either side of the center of gravity. This design possessed the added advantage of stable equilibrium, since if the car should turn to either side, more

of that side would be covered by the gravity screen and tend to rise.

The new screen was completed and put in position on the car. Thereafter on our test trips we met no more mishaps from this or any other source, nor did we discover any injurious effect from drifting for hours free of the earth's gravitation. At length we were satisfied that our car would make the trip without mishap, and there remained only to load it and wait for the moon to reach its proper position. We had decided that the most advantageous time to land there would be at the full. When our tests were completed it was nearing the full late in August, and since we would require two weeks to reach it, we must start at the next new phase. During the two weeks that remained we busied ourselves in stocking the cupboards with every imaginable kind of canned and condensed food, reading matter, and similar supplies.

Finally all was in readiness. Toward sunset of a clear autumn afternoon Wiley and I bade farewell to those few of the College faculty who were in town and proceeded to the field where the space-traveling sphere awaited us. Wiley appeared as calm as though he were about to take a Sunday afternoon drive, but I must confess that I felt considerable nervousness. We had regulated our chronometer to a fraction of a second, and as the orange disc of the setting sun touched the horizon we entered the car and bolted the air-lock fast. Wiley took his position by the switchboard, while I kept watch on the chronometer. At seventeen minutes, thirty-two seconds after sunset he closed the switch that sent us on our way, with that now familiar sensation of dropping.

We kept the port-hole open until we had left the atmosphere, in order to verify our direction; then, when the slowly-passing stars had shown that we were headed for the position the moon would take two weeks hence, we closed the steel cap over the glass and resigned ourselves to hours of reading and sleeping punctuated by occasional meals and observations of the stars. We agreed that one of us should always remain awake, though for what purpose it would be hard to say, since there was no navigating to be done.

We had provided ourselves with shoes having magnetized steel soles in order that we might have some footing, for, being insulated from the attraction of all the heavenly bodies, there was not even enough gravity to hold water in a glass. Because of this, an amusing spectacle presented itself when either of us went to sleep. Following our terrestrial habits, we lay down to rest on whatever surface of the car appealed to us, but the slightest movement was sufficient to send our heads away from the wall of the car while our feet, anchored by the magnetic shoes, held fast. One was apt to find himself in any fantastic attitude when he awoke. The sight of the waking person was even more grotesque, especially if he happened to be on the opposite side of the car, for then the sleeper apparently hung head down in peaceful repose. We had brought along a camera and a supply of films, and I used several of these making time-exposures of Wiley in various attitudes, none of which, unfortunately, turned out well.

Nearing the Moon

TEN days dragged by, marked only by the hands of the clock, before the first event of real interest occurred. We now left the port-hole open continuously, since the danger from falling meteorites was small, due to their lesser velocity at this distance from the earth, and while looking through it at the stars at Wiley slept, I noticed a thin crescent of light on the outer edge of the steel frame of the glass—the rays of the moon. By a simple triangulation I computed its position with respect to our own, and knowing our respective velocities, verified my expectation that we would cross its orbit as it reached the full phase.

From then on, Wiley and I watched the progress of the reflected rays down the frame of the glass until, by pressing our faces close to the opening, we could see the edge of the sunlit surface. It resembled the moon-rise on a dusty evening, its color

being a dirty orange, and the disc was much larger than as seen from the earth. It was already near the full, but since we saw it from a different angle than terrestrial observers, only a little over half the surface visible to us was lighted by the sun. The mountain ranges near the terminator (the dividing line between sunlight and darkness) were plainly visible, as they are seen from the earth through a small field glass, and by employing the powerful binoculars we had brought we reduced its apparent distance to about thirteen hundred miles.

Because of the small size of the glass port-hole we were forced to take turns observing it, and while Wiley was using the binoculars I checked our position. We were about forty thousand miles from the moon and had completed five-sixths of our journey. At this point the attraction of the moon would overcome that of the earth, and we would fall toward it unless we turned the gravity-screen to that side of the car. This would of course cut off our view of the moon, except for an occasional necessary glimpse while landing, when the screen would have to be opened for a moment.

I was about to call Wiley's attention to this when he uttered an exclamation.

"Marland, come have a look," he called. I hurried to the glass and he moved aside, handing me the binoculars. I examined the visible portion of the moon's surface but could see nothing out of the ordinary. I was about to say as much, when he directed: "Look on the dark side, near the south pole."

I turned my glasses* toward the lower portion of the globe. There, perhaps a sixth of the distance from the equator to the pole and almost on the terminator was a tiny speck of light, barely distinguishable even to my excellent eyes, and all but lost in the glare of the sunlight on nearby mountain peaks. At first I though it might be an illusion in the glass, but I was struck by the peculiar color of the light—blue, or blue-green, with perhaps a slight yellow tinge; but entirely out of keeping with the surroundings. Even as I looked more closely, it faded into the line of sunlight and was invisible.

"Did you see it?" asked Wiley.

"I did," I replied, "but it's gone."

"Gone out!" he exclaimed.

"No," I returned, "it crossed the terminator and was lost in the sunlight."

"Impossible!" exclaimed Wiley. "How could it have crossed the terminator? It was miles away when I saw it. Besides, how could a volcano move?"

"Volcano!" I exclaimed. "Do you think it was that?"

"What else could it be?" he demanded.

"Then why wasn't it seen before this from the earth?" I asked.

"Plenty of reasons," he returned. "In the first place it was so faint as to be almost invisible, although we have no atmosphere between it and ourselves. The distortion produced by the earth's atmosphere would make it invisible. If not, it might easily be hidden by a range of mountains; you forget that we see the moon from a different angle now. And finally, it may not have existed before now!"

He seized the glasses and went to the porthole for another look, but after several minutes of close scrutiny he gave up, unable to locate the light again.

I suddenly recalled that it was high time that the gravity screen were closed, and mentioned it to Wiley. He gave up his position reluctantly, and I closed the steel cap over the porthole and set in motion the motors to shift the screen. Wiley returned the binoculars to their case on the wall and remarked, musing:

"What do you suppose could cause a volcano to stop erupting like that?"

"Probably it's still going, but you can't see it because of the sunlight," I suggested.

"No," he objected, "it was too far from the terminator when I saw it. The sunrise doesn't move that fast."

"It might have been on a gentle slope," I said. "The sunlight would travel down the slope pretty rapidly."

*The glasses were of course erecting glasses, differing in this respect from astronomical telescopes through which inverted photographs of the moon are made, giving the impression that the moon is "upside down," with the south pole at the top of the picture.

FOR answer Wiley went to one of the shelves in which were stored, among other things, a number of maps of the moon's surface, together with a number of photographs. From these he extracted a view of the section we had just been discussing which, though seen from a different angle, was still fairly recognizable. We examined the map closely for some such formation as I had suggested but failed to find any which might meet the conditions. Then we tried to recall the location of the point as we had seen it.

Wiley indicated by a dot the place where he had last seen it, and I indicated where it had crossed the terminator. We looked at each other in considerable amazement, for not only did our estimates as to the distance from the edge of the shadow differ, but my point was considerably further north than his! Nor could we reconcile our views. By reference to surrounding landmarks it was possible to set limits to our possible errors in observation, and we enclosed each of our points in a circle which made the maximum possible allowance for such errors. Yet our two circles were a quarter of an inch apart at their nearest point! Wiley insisted that the light had been well clear of the terminator, while I was equally certain that it had crossed the terminator.

Allowing for the motion of the sunlight itself while we had changed places—which was, in fact, almost negligible, since the terminator travels on the moon at about nine miles per hour—we had still a difference of some fifty miles in our points. There was only one inference; the light had moved!

A further examination of the scant data we had on the subject showed even more startling results. At the very least, the source of the light had moved fifty miles in five minutes or less—from the time Wiley had first called my attention to it until the time I had located it just as it crossed the border of the shadow. In other words, it must have been traveling at a rate of six hundred miles an hour!

In the face of such figures we were both inclined to question our minds as to the certainty of the position of the light. But the facts remained unquestionable. Wiley had seen it well in the shadow and I had seen it pass into the light. It had moved, and it seemed likely that its motion had been very rapid.

The subject of this mysterious traveling point of light occupied our minds for the greater part of the remaining journey. We pored over maps and photographs of the moon's surface, speculated on the nature of such a high-speed body, and thought of every possibility—so it seemed to us—even going so far as to raise the question of intelligent inhabitants, living perhaps on the interior of the satellite, or even a form of life which was not dependent on air for existence.

The thought intrigued us, yet I must confess that my interest was not unmixed with apprehension. A people sufficiently intelligent to maintain their existence in spite of the evident lack of air or water on the surface of the moon must necessarily be far in advance of the human race in mental development. We should probably be looked on much as are the rats which invade our homes in their own selfish interest, just as we were at present bent on invading the moon. The prospect had, at least, its questionable angles.

Wiley, too, was evidently thinking deeply on the matter. He had put away the maps and photographs and was sitting (insofar as it is possible to sit without the aid of gravitation) on the opposite side of the car, his hands clasped around his knees, his toes stuck under a projecting valve to anchor himself, gazing into nothingness. Presently he spoke, as if addressing himself to his thoughts rather than to me.

"Let's see what we've got," he said. "First, I saw a light. Then you saw the same light cross the terminator. We have only estimates of the distance it moved, but we agree that it was too far for the sunlight to travel so as to cover a stationary point. The best estimate gives it a velocity of six hundred miles an hour. Suppose we're wrong by half that; it still moves faster than anything on earth except bullets and some airplanes. The question is, what

was it? A machine driven by some living being? What sort of being could live on the moon? There is no air—no water. Even supposing a creature with a super-intelligence, such that could manage to remain there now, how did it develop? The moon must have lost its atmosphere and water long before the surface solidified. It can never have been a habitable globe like the earth. Then either the creature, supposing there is one, has a body radically different from our own, or else he is an immigrant from some other planet. But if the former, why has he never come to the earth? And if the latter, why go to the moon at all?"

He sat huddled, motionless, his eyes half closed, and presently he appeared to have fallen asleep. I got out paper and pencil and was about to re-compute our position, as I was constantly doing in order to discover any deviation from our intended course, when he uttered an exclamation.

"Of course!" he cried. "Nothing simpler! Marland, what a pair of idiots we are! Super-beings—life without air—tommyrot!"

I wondered what was the cause of this outburst, but was quickly enlightened.

"We have been fortunate enough to find a new member of the solar system," he said smiling. "What we saw, Marland, was probably a sub-satellite—the moon's moon. A little globe revolving around it at a distance of a few thousand miles—probably not far from where we are; hence the apparent rapid motion. It passed between us and the dark part of the moon, then across to the bright side and was outshone by the reflected light of the moon. Too dim to have been detected from the earth because of the atmospheric refraction."

This simple and logical explanation of the phenomenon presented such an easy solution to the problem that we were both surprised we had not thought of it before. Wiley and I were both anxious to take a further observation in order to determine the size and behavior of this lunar satellite, but this was out of the question at present. Indeed, it was quite a problem to get enough data to check our position, as we had to do frequently, without unduly exposing ourselves to the attraction of the moon.

CHAPTER IV.

Journey's End!

AS THE hours passed, we drew closer and closer to the end of our journey. We remained awake constantly now, and nearly all of our time was spent in calculating the exact moment and spot of our arrival, from the latest observation. We found that we should arrive somewhat to the south of the equator, on the "sunrise" side—that is, the portion on which the sun had been shining for less than half of the two-weeks-long day. This section of the moon's surface was more thickly covered with mountains than some, but there were a reasonable number of level spaces, and it was in this quarter that some of the most interesting features of the globe were to be found, such as the giant craters Tycho and Copernicus with their radiating streaks.

At length there remained only a thousand miles or so between us and the moon. At our present rate we should reach it in somewhat more than an hour. We spent the remaining time in arranging the loose articles in the car, such as dishes, bottles, reading matter, and similar debris, so that they would not pile up on the downward side of the car when we landed and opened the gravity screen.

The amount of junk which we had amassed was tremendous; we had not bothered more than once or twice to make use of the air-lock to throw out our trash, and there were empty meat-cans, bottles and such stuff which were of no use to us whatsoever. Wiley suggested that we pile them into the air-lock so that they would be out of the way and could be thrown out as soon as we landed. We began this at once, but the action immediately called our attention to another fact; the air-lock was turned toward the moon, and was covered by the gravity-screen, since we had been looking through its glass port-hole. It would be

down when we landed, and would make it impossible to leave the car. This gave us a moment's worry, until we recalled our former startling success in turning the car upside down during our first trial trip. Accordingly we took our final observation of position when we were but a few miles from the surface, over one of the great plains, termed "seas" by the early observers because of their darker color.

This one was known as "Mare Nubium" (the sea of clouds), and we were approaching the center of it. We quickly calculated our velocity from two observations a few minutes apart, then closed the port-hole for the last time until landing and turned the gravity-screen until the car rotated through 180 degrees under the influence of gravity; then closed it entirely, shutting ourselves off once more from all attraction. Then we opened the valve controlling the flow of gas into the jets pointed toward the moon and touched the electric spark.

Having become accustomed during our two weeks' journey to move about the car as we pleased with no regard to the relative directions of "up and down", we had neglected to hold on while doing this, and we found ourselves in rather laughable circumstances as a consequence. However, the acceleration of the gas was not sufficient to throw us very violently to the bottom of the car, and the situation was more humorous than unpleasant. We had just picked ourselves up and endeavored to become accustomed to the strange sensation of direction once more, when there was a moderate jar announcing our landing. Wiley jumped to shut off the gas while I opened the gravity-screen. The jar was repeated, the car having "bounced" a little from the surface, but it promptly settled down on an even keel, and we were on the moon!

So far our journey had been carefully planned, but now that we had reached our objective we were rather at a loss as to our next step. "Exploration" had been vaguely mentioned, but we had outlined no route. However, our bodies had been cramped in the small interior of the car long enough to desire action, so with one accord we unpacked our "diving suits" (the term is poorly applied, but we never gave them any other name) and put them on. They were unwieldy things, but with the slight gravity of the moon we managed them quite well.

I was ready first, and released the fastenings of the inner door of the air-lock. As I lowered this, I was showered by the refuse which had been hastily piled into the opening and forgotten in the excitement of our landing. I took an armload with me, leaving Wiley to bring as much as possible with him, and climbed into the air-lock.

The doors to this could be fastened from inside or out, so as to remove the necessity of an operator inside the car. Once inside the lock with the air-tight doors bolted fast, a pump exhausted as much of the air as possible into the interior of the car, in order to conserve our not over-abundant supply of the vital gases. I had crowded into the small space, fastened the door, and soon afterward the swelling of my suit to its interior pressure told of the pump at work. I waited with as much patience as I could muster until the air was thinned out to a near-vacuum, and released the catches to the outer door.

A blaze of sunlight such as I had never seen before met my eyes. I wore dark glasses, but even so the brilliant light reflected from the rocky plain about me was almost intolerable. I stepped out onto the top of the spherical machine, reclosed the door, and after kicking the rubbish over the edge began to survey the surrounding territory while waiting for Wiley.

WE were situated approximately in the center of a vast plain extending in all directions to the horizon, broken here and there by low elevations. The smaller and closer ones presented an appearance suggesting the crater formation familiar to those who have seen the moon through a telescope, while those in the distance resembled lines of jagged cliffs, being too remote and too high to be seen in their true form. The floor of the plain itself resembled a mud flat from which the water has receded, leaving its surface dried and cracked by the sun. Indeed, we soon found out that it was much like that, the surface rock being split

and checkered by ages of boiling heat followed by cold unknown to the earth.

The sky was even more remarkable—jet black, with thousands of stars blazing with a splendor beyond description. The sun was dazzling, even more so than on earth; by peeping over my arm I could see the corona, and a red spot which might be a huge prominence. The earth was faintly discernible as a pale circle of light close to the sun, visible only by the light refracted through its atmosphere.

My observations were interrupted when Wiley's head appeared through the air-lock, and after blinking for a moment in the sunlight he stepped out beside me. We had no method of communication other than gestures, supplemented by what lip-reading we could do through the glass of our helmets, but he presently made me understand that he wished to descend and explore the plain about us. We made our way cautionsly along the curving surface of the sphere to the ladder which extended up the outside. I started to climb awkwardly down, but Wiley made a flying leap from the twenty-foot height on which we stood. I turned in startled amazement, having forgotten the slight attraction of the moon, and watched him float as if on a parachute, landing with perfect ease on the ground.

I followed his example, but with less grace, landing on my hands and knees, but with no discomfort. We started off at a brisk walk, but our first step lifted us clear of the ground and we coasted several feet before touching. Our muscles, accustomed to earth-travel, instinctively exerted enough pressure to bear our normal weight, but meeting with little resistence lifted us clear off the ground. We experimented a bit and found that by leaning slightly forward we could travel at a fast trot with practically no effort.

We set off in this manner toward the nearest of the little craters. We must have resembled a slow-motion picture of a pair of sprinters, so leisurely were our movements. Our feet raised clouds of the fine dust which covered everything, but like everything else on the moon, this dust behaved in a strange manner. It rose to a greater height than on earth; then, instead of remaining suspended, large and small particles alike fell to the ground, leaving not the slightest haze behind us.

Until now I had been so absorbed in the new sensations which surrounded me that I had not noticed a growing sense of discomfort, but suddenly I realized that it was becoming intolerably hot inside my protecting suit. The temperature increased as I went a few steps further, and I realized that if I did not find shelter from the sunlight soon I would suffocate. I tapped Wiley's arm and started for the shadow of the nearest rock. It was some distance away, and I realized that I was rapidly losing consciousness when I stumbled headfirst from the glare into the blackness of night and fell to the ground.

My exhaustion perhaps saved my life, for I had barely gotten into the inky-black shadow of the rock, and lay with my face only a few inches from its edge. As I recovered possession of my faculties I saw that the glass of my helmet had become coated with frost condensed from my breath. The temperature around me was many degrees below zero; the effect of extreme changes of heat on glass is well known. No doubt the heat reflected from the sunlit ground a few inches away had saved my glass from cracking and letting out the air.

A few moments' cooling sufficed to set my teeth chattering, and Wiley and I set off once more, being careful to stop in a shadow once in a while. We reached the little crater toward which we had been walking, and skipped up its side as easily as two mountain goats. It was perhaps one hundred feet high, the sides sloping at an angle of about sixty degrees. The rim was jagged and split by many fissures, while pieces of rock had scaled off and slid into the interior. From where we stood we had a good view of the entire crater. It was about five hundred feet in diameter, and the floor was studded with tiny replicas of the crater itself, a few feet in diameter, while in the center was a small cone, rising to a height of some thirty feet.

A Puzzling Phenomenon

AS we stood looking at the crater, an odd thought ran through my mind. "Pancakes," I said to myself. Pancakes were one of my weaknesses, and I had had ample opportunity to make them during our trip. The interior of the crater resembled a vast pancake on the griddle. Bubbles of escaping gas had burst, leaving holes as the surface stiffened and solidified. Perhaps the crater itself was such a bubble left by a larger uprush of gas.

We descended into the crater and examined the formations more closely. Everything seemed to bear out my idea. As the surface of the moon had cooled, gas had formed in spots under the hardening crust, and presently burst through, piling up the semi-solid lava in a circle around the eruption. Later, as the cooling proceeded, the crust of the interior of the crater, being thinner, was more easily broken; hence the many small pits. All this activity had long since ceased, and the dust of ages of exposure to heat and cold covered everything.

At length we started back to the car, for despite the ease of travel we found the heat quite enervating and the need of rest and a meal was pressing. We had been gone several hours, and we could not be sure just how long the air in our suits would last. We hurried along, going from rock to rock, resting a few minutes in the shadow of each and taking a slightly different route on our way back.

We had covered perhaps half the distance to our machine when I felt Wiley touch my arm. Looking in the direction he indicated, I saw that not far to our right there were evidences of the all-pervading dust having been disturbed. We walked in that direction and came to a patch of bare rock some fifty yards across. The dust had been swept clean, piling up around the edges of the bare spot as if a circular windstorm had blown it away. But that obviously was not the cause of this phenomenon, as we well know. What could have caused it? As I turned the matter over in my mind, the thought of meteorites occurred to me, and I started for the center of the space to look for traces of meteoric stone. I examined the ground closely, but found nothing whatsoever except a few scars on the rock itself, as if it had been melted by some tremendous heat. They seemed fresh, and might possibly have been caused by the fall of a meteor.

We continued our journey with no further events, and presently were once more within the car with a meal cooking on the electric stove. Neither of us referred to the events of our trip until we had finished eating and settled down to enjoy a smoke. Then Wiley spoke.

"What do you make of that bare spot?"

"Probably the mark of a meteor," I replied. "It looks quite recent."

"Recent, yes." He paused. "But why haven't we noticed any more meteors?"

I thought for a moment before answering: "Perhaps the earth gets most of them—its superior gravity, you know, and so close. They would have to be headed just right to get here." He nodded.

"But why didn't we find the meteor itself?" after a moment.

"It probably hit hard enough to be heated to gas," I answered.

"It would take considerable speed," he observed. "By the way, what velocity would a meteor have, landing here?"

"If you assume it to fall from rest an infinite distance away, it would be going a mile and a quarter a second," I said.

"The Big Berthas did better than that during the war," he remarked. "Ever hear of a shell turning to gas when it hit?"

"No," I admitted. "But the meteor might have exploded like a shell."

"Not likely," he said, "but it's possible, I grant you. Perhaps our friends at the City College are dropping us a note." With which remark he ended the discussion; but long after I lay down for a sleep he sat up, engrossed in his thoughts.

I was awakened by the smell of food, and found I had a prodigious appetite.

"About time to get going, old timer," said Wiley. "You've slept the clock around and then some."

We quickly dispatched the meal, donned our "diving" outfits, and were soon out on the surface of the moon. Despite the pass-

ing of more than twelve hours since we had last seen it, the sun had moved but little, and everything was much the same. This time we set out in a different direction toward another of the small craters. This one was more distant and somewhat larger than the first, but we made better time in reaching it and climbing its steep sides, having become more accustomed to the strange mode of travel. We spent a little time exploring its interior, which was much the same as that of the other crater, and presently made for the little cone which so often is found in these formation in the center of the circular hollow. Its sides were steep, and on reaching its summit we found a vent extending down inside to an unknown depth. The sunlight penetrated a few yards, in which the walls narrowed slightly, suggesting a funnel; beyond this we could see nothing.

Wiley motioned me to follow him and started to pick his way cautiously down the steep side of the funnel. I followed to the edge of the sunlight, and we stood for a moment trying to fathom the inky depths. Presently our eyes became more accustomed to the darkness and we could see the faint gleams reflected from footholds just below us. We took a few steps downward and were surrounded by darkness.

Suddenly I was startled to see the side of the pit opposite me illuminated. I looked for the source of the light, and discovered that Wiley had succeeded in withdrawing his arm from its covering into his suit, and had taken a flashlight from his pocket and directed it through the glass of his helmet. He turned it into my face, then away, and I could see that he was laughing at my surprised look. Then he turned the light below him and led the way further into the depths.

We descended for perhaps another hundred feet, the walls of the funnel narrowing until we could brace our feet against one side and our backs on the other. We paused, and Wiley turned the light downward. The shaft continued toward the center of the moon, no one could say how far, without becoming much narrower. I would have liked to continue, but it was inadvisable, as we had quite a climb back to the surface and must consider our air-supply.

I looked up. The funnel framed a circular patch of sky above us, in which the brighter stars blazed with brilliant splendor on a jet-black background powdered with other stars too small to be distinguished one from another.

It was now some twenty-four hours since we had landed, and for the first time I saw the surface of our mother earth. Not very much, to be sure, only a thin sliver of light was visible, like a huge day-old moon. The crescent shone with a brilliance far surpassing everything in the heavens except the sun. I wondered what what it would be like at the full, when the sun would have set on our side of the moon.

One moment I was looking at the silver thread of the earth; the next I was blinded by a glare of light sweeping across my field of vision. The heavens were obscured by a broad fan-tail of flame, blue, or blue-green, with a tinge of yellow in it. I closed my eyes for a moment to let the dancing spots on my overtaxed retinas fade and looked again, but it was gone. In the glimpse I had had it seemed to be moving to the southward. I thought I could detect a glow on the northern side of the funnel above me, but my eyes were still too blinded to be certain.

I felt Wiley below me pushing me upward urgently, and with as much speed as possible I scrambled up the side of the pit. It required perhaps five minutes to reach the top. We faced south with one accord, and there, over the rim of the crater, far in the distance, could be seen a faint blue-yellow glow. It did not strike me as strange at the moment, but Wiley pointed out its meaning later.

We had retraced our steps to the car and were discussing the appearance of the light.

"Did you notice the after-glow?" he asked, and as I nodded, "Do you realize what that means? Gas, Marland. There must have been gas. You know that light cannot be diffused in a vacuum. The air does it on earth, but we have no air here. There must have been a body of gas attached to that light, or the light gave off gas, which glow-

ed. Now what could be liberating glowing gas so near the moon?"

We sat silent for many minutes. Finally Wiley answered his own question, in part.

"It may have been a small comet," he suggested, and made haste to bury himself in a book. Obviously he did not wish me to point out that the comet, if comet it were, had passed between the earth and the moon, and with a velocity heretofore unheard of.

I must have fallen asleep, for presently I had a sensation of motion, and awoke to find Wiley manipulating the controls. He answered my questioning look with a single phrase: "Heading south." Further explanation was unnecessary. I knew he had closed the gravity screen and given the car a start to the southward; we were drifting under our momentum in the direction of the light which we had seen, once before landing and later over the nearby crater, cruising about the southern section of the moon's surface.

CHAPTER V.

An Awesome Sight!

WILEY had inverted the car so as to take an occasional look at the moon through the port-hole. I left the running of it to him and caught up my notes on the two trips we had made. We traveled for eighteen hours in this manner. There was no way of telling our exact speed, but Wiley estimated it in the neighborhood of a hundred miles an hour. This increased from time to time slightly, due to our changing course to meet the curvature of the moon. If we had continued on our original course we would have left the surface on a tangent and continued in a straight line, but our views below served the double purpose of giving us our bearings and allowing us to fall toward the surface enough to maintain an altitude of three to five miles. The velocity of our fall was in part added to our speed of travel.

Thus we arrived over the moon's south pole, which could be located from the appearance of the terminator beneath us, beyond which the sunlight did not reach. Here Wiley brought the car to a stop and descended gently to the interior of a fair-sized crater. It was his purpose, he said, to remain there for half a month, when the other side of the moon would be illuminated. Then we would continue our search for the mysterious light.

The spot had been ideally chosen, for here the sun never completely set, never showed more than part of its disc above the horizon. The extremes of heat and cold were therefore less evident. Our car rested on a little knoll where the rays of the sun seldom struck it directly but were always reflected from a nearby rock. The earth, part of which showed above the mountain-tops, was nearing its "first quarter", and added to the illumination. The stars of the southern sky showed brilliantly overhead. Neither of us was much inclined to exploration, preferring to spend our time reading or lolling about the car, smoking and meditating. We settled ourselves comfortably for a two weeks' stay.

Our living quarters were given a much-needed overhauling, and put in perfect order. We checked our supplies of food, gas and air, tested the storage batteries, and satisfied ourselves that everything was ship-shape. Then we caught up on our sleeping and eating. Thus we passed the hours serenely, awaiting the sunrise on the hidden half of the moon.

Five terrestrial days had passed since our first arrival. Wiley was immersed in a book and I was peeling potatoes preparatory to getting a meal, when the walls were flooded with a bluish-yellow glare from the port-hole. I jumped erect, but Wiley was at the glass first.

"It's coming down," he shouted, making a rush for his diving-suit. I climbed into mine as he disappeared into the air-lock, and waited impatiently for the pump to stop, signifying that he was out. I followed as quickly as I could, but by the time I emerged, he was already a quarter of a mile away, going at a fast trot toward a bright glow beyond the mountains. When we had gone a mile or more it faded out gradually, but we had located it well enough to be sure of finding its source. We reached the wall of the crater and climbed quickly up, Wiley

several rods in the lead. He reached the summit and passed out of my sight, while I paused from exhaustion.

When at length I resumed my climb and reached the summit, I was first too startled, then too horror-stricken, to move. For at the foot of the slope, two hundred yards from me, sat an awesome and marvelous object. It was in the shape of a cone of fifty-foot base and somewhat greater altitude, with circular windows around the sides and particularly at the top; while from the base, which was pierced at regular intervals by semi-circular vents resembling culverts, there issued a cloud of luminous gas, bluish-yellow in color.

This much I saw in a swift glance. Then I discovered that Wiley was running down the slope toward it. Suddenly from the apex of the cone there issued a jagged flash which struck Wiley as he ran, tumbling him headlong on the rocks. I shouted in an agony of horror and apprehension, and in a futile rage seized a fragment of rock and hurled it at the unknown thing. This evidently drew attention to me, for it emitted another flash which seemed to burst into myriads of stars; there was a crash, and blackness.

* * * * *

To my mind the oddest feature of complete insensibility is one's total ignorance of the passage of time. My sensations on awakening followed immediately upon the flash which had stunned me, yet when I was able to talk I discovered that over fifty hours had elapsed, and my life had once been despaired of.

I was alone with Wiley, who was fully dressed but minus his diving suit. It was lying in an amazingly comfortable bed, in a small but attractive room such as one may find in many American hotels. The walls were painted in a solid color which was restful to the eyes. There were no pictures, and the room was devoid of useless decorations, but contained many conveniences. The furniture was of metal, attractively upholstered and colored. A shaded electric lamp shed a remarkably good counterfeit of sunlight, and though there were no windows the whole effect was inviting and cheerful.

Wiley spoke to me: "Glad to see you're awake again, old man. You had a rather tough time. The doctor had a pulmotor on you for an hour, and would have given up if I hadn't kept after him."

"Doctor?" I echoed, dazed. "Pulmotor? Where are we?"

"This is the headquarters of those fellows in the flying-machine," he replied. "They knocked us out with a high-tension spark. I came around in a few minutes, but you had broken the glass on your helmet, and they had a nice time getting air back into your system and teaching you to breathe again. They're prepared for such things, but you were a pretty bad case."

"WHO are 'they'?" I asked.

"I don't know much about them," he answered. "I talked to the doctor some, but he keeps his mouth shut. It seems there are a lot of them here, and they've been here for years. A man who calls himself 'Forscher', meaning 'searcher', is the guiding spirit. I'm to have a talk with him soon. He, and they, are human, of course, from the earth. They came here in machines like the one you saw; quite an ingenious bit of machinery, by the way.

"I had a look around it after they'd finished working on you. It gives off gases at a tremendous velocity, and the recoil drives it. Same principle as the gas jets on our car, but much more powerful. Apparently they haven't any gravity-screens, but the force of the discharge from their machine is sufficient alone to lift it free of the ground, and they get up some pretty big velocities. We're two thousand miles from the pole, yet they got here in three hours."

"What are they doing here?" I asked.

"I couldn't say," replied Wiley. "The crew that picked us up was sent out to do just that. They found our machine on one of their trips and reported it. We saw the mark of their landing—where your 'meteor' had blown away the dust. They got orders to bring us back, and here we are. That's all they've told me, and apparently it's all we're to know until I talk to Dr. Forscher."

As he finished speaking, the door opened and a man in a white coat entered. He was

perhaps forty, tall, with close-cropped blond hair, and wore rimless spectacles. From the bag he carried, I judged he was the doctor Wiley had referred to. He nodded pleasantly to Wiley, and turned to me.

"I am pleased to see that you are again conscious," he said. His slight accent confirmed my impression that he was of German birth. He produced a stethoscope and set about an examination of my heart and lungs which was as rapid as it was thorough.

"There will be no danger," he announced presently. "Some food will taste well—is it not so? Then a long sleep, and you will be as good as before."

His prescription suited me perfectly. He took his departure, and in the course of a few minutes a dapper Frenchman appeared carrying a tray of food.

"*Pour le malade,*" said he, indicating me; then to Wiley, "Monsieur will follow me to the dining hall?"

"I'll see you after you've had some sleep," said Wiley, as he departed.

I turned to the dinner which had been brought me. There were dishes I had not seen for weeks—fresh green vegetables, fresh meat, butter, milk! Evidently there were farms and dairies on the moon. I attacked the meal with considerable appetite and made a respectable impression on it; then, more comfortable and very tired, I fell asleep.

When I awoke Wiley had returned. His face shone with a a smile of satisfaction, and I was filled with curiosity.

"Have you seen Dr. Förscher?" I asked. He nodded.

"I have," he replied, "and a good deal besides. I had dinner with some of the higher-ups and was shown around a bit. Then I talked to the Doctor and found out some more. We're scheduled to be guests of honor here for awhile, to get acquainted with the place. I don't know what will happen then, but you may be sure that we're quite welcome, much more so than when we first arrived. I didn't mention it to you, but we were considered as interlopers, and weren't very popular at first.

"You see, this Dr. Forscher is a rather reclusive sort, and while he supposed that some day someone would succeed in getting to the moon, he hoped it wouldn't be until after he had finished his business here and passed on. But he was much relieved to find out that we weren't the advance guard of a sizable expedition, and that no one knows the secret of the machine except ourselves." Wiley paused to light a cigarette, then continued: "They picked up the old space-traveler and brought it here to find out what makes it work. But they can't, unless I help them, and the Doctor knows it by now. So they're keeping it for us—to make sure we don't run away before he's ready to let us."

"What sort of a man is he?" I asked. "And why is he here?"

"As to the latter, I don't know," replied Wiley. "Nobody seems willing to tell me, and I can't guess. But as for the doctor, he's quite an odd sort. Not very attractive physically; about five-feet-two, as a guess, with a head all out of proportion. He just sits like a statue while he talks to you, but I really believe he can look right into your mind. He has the most marvelous intellect I've ever seen."

This, from Wiley, was a real tribute, for the world can count on one hand the men with minds equal to his.

"He's what you might call a super-scientist," he continued. "He knows more physics than the whole department at the City College; the world's best chemists are mere tyros compared to him. As a physician or surgeon he could have made a fortune on earth. The science of psychology is mere A-B-C to him; and he can solve problems in mathematics without putting a mark on paper that would take me an hour or more. That is by no means a comprehensive list of his achievements. He had specialized in none of the sciences, but he knows them all, and better than any man on earth. Everything in this colony is the product of his mind; he conceived it, engineered it, built it, and now he rules it.

Many Wonders

"I'VE seen enough of the place to appreciate what a man he is. For instance, there's the air. Perhaps you've noticed its

freshness. It should be fresh— it was made a few hours ago! He makes the oxygen and nitrogen right out of the rocks around us. There's plenty of oxygen to be found in the quartz but its hard to get out, and there's little, if any, nitrogen to be found in any form. Nevertheless, he *makes* both of them, by a kind of atomic chemistry. He gave me a general idea of the process. He uses high temperatures and strong electric and magnetic fields to break up the atoms of some elements and then recombines them into others. Silicon seems to suit the purpose well, and there's plenty of it, in combination with oxygen, all around us in the form of sand and quartz.

"He uses the same principle, indirectly, in driving those flying machines, which they call tractors. Do you remember our talk, the night you wrecked your car, when I mentioned that if anyone could find a way to build up a radioactive atom more complex than uranium he would have a storage battery for unlimited power? It's a substance like that which drives the tractors. It takes millions of horsepower to make a pound of it, but the power all comes out again as it's wanted.

"Did you enjoy your dinner? Perhaps you're interested in knowing where it came from. There are acres and acres of artificial soil where plants and animals live under quartz-glass roofs, receiving light from the sun and from arc-lamps. The cattle, hogs and chickens he raises would be the despair of our best farmers, and the 'tall corn from Iowa' isn't even in it compared with the crops he harvests the year around. Marland, that man has everything there is to be found on earth, and he's gone nature one better in every way.

"I found out, too, where the power comes from. The most obvious source—the sun; and very simply. From sunrise to sunset there are hundreds of boilers heated by huge burning glasses, which generate electric energy. Part of it is stored in batteries for the dark period.

"This colony lives underground, in a system of excavations and tunnels that extends for several miles around. There are hundreds of men, but no women or children. I don't know how he intends to replenish his labor supply when age and accident take a hand. They've been here eleven years, building and digging. There are a corps of scientists who are the Doctor's assistants and share his confidence to a considerable extent. The rest are mechanics, artisans and laborers. One of them told me where they all came from. There are French, Germans, Belgians, English, Austrians—almost every white nationality on earth. They have enough to do, but never too much, and enough variety to make it interesting. They've provided with facilities for recreation, comfortable quarters, and plenty of food. They seem contented with their lot, and indeed they may well enough be.

"Some of this the Doctor told me, and some I found out from other men. But the most interesting thing of all—the reason for this tremendous establishment so far from the earth—no one has mentioned. He wants us to become acquainted, and then he's going to have a talk with both of us. Meanwhile there's nothing much to do but make ourselves at home."

He sat in silence for a time, while my head whirled from the multitude of wonders he had described. But I was anxious to be up again, and see for myself this strange subterranean world of humans a quarter of a million miles from their birth-place. I set about exploring our apartment, and found a completely equipped bathroom with facilities for shaving and a shower-bath. I immediately availed myself of these, and once more dressed and moving about, I found that my appetite had returned. In answer to my question, Wiley informed me that there would be a meal in the dining hall in half an hour or so. Meanwhile, he suggested that we take a stroll around the hallways, which suited me perfectly.

I found that the corridors formed a large H, with the laboratories and farms opening from the parallel passages and the living quarters, dining-hall, etc. along the connecting corridor. The doors in most instances bore only numbers, though a few had legends in many languages over them. One of these was the dining-room, to which we presently returned.

We were led to a table at which were seated several men of various nationalities who, Wiley told me, were Dr. Forscher's scientific assistants. The Doctor himself preferred to eat alone, seldom joining the others in the dining-hall. Wiley introduced me to each of the men at the table. They were for the most part unknown to me, though in a few I recognized men whose names had once been familiar on earth.

They had best remain anonymous, for reasons which will presently be understood. There was also the Chief Engineer, whom I shall call Dr. Langley, who stood highly in the estimation of Dr. Forscher, and who had been partly responsible for the feats of construction at which we marveled. He told of the difficulties which had been overcome us, during the course of the meal, of some since their arrival. It seems that he had come in company with Dr. Forscher and some of the scientific staff, together with a part of their present labor force, some eleven or twelve years before. They had established a small headquarters, digging a cave into the rock, fitting it with an air-lock, setting a small power-plant in operation, and converting the cave into a work-shop.

With this as a starting-point they had designed and constructed the vast subterranean labyrinth which formed the present dwelling of the colony, increasing the power-plant as necessary. At present there were accommodations for nearly twice as many inhabitants as it now held, and no more construction was under way, their activities being directed into other channels. Here he stopped, as if fearful of having said too much, and we could learn nothing more.

THAT there was some purpose to this organization as yet unfulfilled, we had no doubt, but every time the subject came up we ran into a blind wall. Wiley and I had made conjectures as we explored the corridors, but we could arrive at no reasonable supposition. In the list of laboratory directors the sciences were nearly all represented, yet none seemed to predominate. Thes scientists, we learned, had all come of their own volition; yet with every opportunity for fame on earth, with greater facilities than could possibly be presented here, why had they chosen an existence on this barren satellite, so inaccessible, so cut off from communication, so fraught with danger? For solitude? It hardly seemed likely. In fact, one might find comparatively greater privacy on earth than here, pent up with a few hundred fellow-beings whose daily association was unavoidable. There must be some more powerful motive, which was so far wrapped in secrecy, guarded by the trusted few who surrounded Wiley and myself at the dinner-table.

The repast was finished, and at Dr. Langley's suggestion we adjourned with him to his own apartment. We settled ourselves for a chat, and discussed further the work of constructing the colony. He told us in detail how the air-plant operated, leaving out only the vital principle which enabled Dr. Forscher to destroy and reconstruct atoms, which, he confessed, was known only to the doctor, the head of the physics laboratory and a few others. He described also how a continuous circulation of water was maintained; the sewage being filtered and boiled so as to render it pure again. It was of course simple to supply more, uniting hydrogen and oxygen by combustion, but it was seldom necessary.

We found out many other interesting things; how, after the glass covered pastures had been made for for them, a few cattle, sheep, hogs, etc., had been brought from the earth and allowed to multiply to the present herds; how it had been necessary, for the first year or to, to live almost entirely on synthetic food, made there in the workshop; how they managed to procure the materials for their work. Some minerals, he told us, they found it easier to mine, as they were found in large quantities about the moon. Iron was one—they had several iron mines. They were reached by flying-machines, and maintained separate power, air, and water plants.

Some substances too, could not be found on the moon, and were too difficult of manufacture, notably organic substances. Chief among these was wood. Dr. Forscher projected the planting of a forest of timber in the near future, but it would take many

years to reach maturity. In most cases a more durable substitute had been found—metal for furniture, doors, etc.; concrete stairs and floors. The indispensible materials of this sort had been brought from the earth and used as sparingly as possible, but at some future time it would doubtless be necessary to renew the supply.

Dr. Langley added, too, that the need for occasional communication with the earth was growing increasingly evident, as a greater labor force was needed, especially since time and accident had contrived to materially reduce its original numbers.

At this point we were interrupted by the ringing of the wall phone, and Dr. Langley answered it. We gathered from his remarks that something was amiss. As he hung up we prepared to take our departure but he detained us.

"Would you care to take a trip to one of the mines?" he asked. "The airplant has broken down, and I must go there to supervise repairs and of course remove the men."

Wiley turned to me. "How about it, Marland," he asked. "Have you energy enough, after your siege?"

"Try to count me out!" I exclaimed. Dr. Langley nodded his approval and turned to the phone again. Getting in touch with the Chief of Transportation, he ordered two tractors made ready for flight; then he gave directions to a corps of mechanics, and finally signified his readiness. We followed him to one of the corridors near the center of the main tunnel, and for some distance along this to a store-room. He took out three of their "air-envelopes," which served the same purpose as our diving suits, and illustrated the method of donning them. We found them much better than our own in many respects. Besides greater ease of movement, each was equipped with a small radio apparatus consisting of microphone and miniature loud-speaker, having a range of a half a mile or more, so that conversation was easily carried on. They were also heat-insulated, to guard against the unpleasantness which we had experienced, and the helmets were entirely of colored glass, which permitted greater ranges of vision, yet prevented possible sunblindness.

CHAPTER VI.

A Tragedy!

DR. Langley now conducted us through the smaller of two doors into a cylindrical chamber which served the double purpose of air-lock and elevator. The doors, when closed, were hermetically sealed, and by touching a button we were carried rapidly a hundred feet or so to the surface. Meanwhile a pump had been exhausting the air in the chamber, and we now stood in a nearly perfect vacuum, with only another air-tight door between ourselves and the exterior of the moon. On stepping out we saw before us two of the huge conical flying machines, each with a wisp of vapor issuing from the semi-circular openings at the base. Following Langley, we approached the nearer, and I was startled to hear his voice, loud as a gun-shot, from the radio speaker: "Aboard the tractor! Open up!"

"Yes sir!" came a response, and in a moment a door opened in the side just above the ground. Passing through another door to the right to the interior of the machine, we found ourselves in a circular runway extending entirely around the base of the machine. A tall man might have had difficulty standing erect in it, as there was little more than six feet head room. The sides slanted toward the apex of the machine at slightly different angles, the inner more nearly vertical. The floor was approximately ten feet wide, and the roof somewhat less. On our left, directly outside the air lock door, was a ladder leading to compartments above. We mounted through two more compartments differing from the first only in that they were continuous, having no air-lock.

Dr. Langley mentioned in passing that they served as cargo space or as accommodations for passengers. The ladder continued up to a trap-door in the floor of the fourth compartment. This was open, and we climbed into the engine room of the tractor. Here we removed the air-envelopes, and Dr. Langley showed us through

the room, explaining the driving principle and the apparatus in the engine room. It was much larger than those below, and jammed with machinery which nevertheless occupied a minimum of space, so well was it arranged. There were eight huge generators, covered with aluminum cases which served the double purpose of protecting the occupants from injury and preventing possible leakage of air, as the machinery was driven by turbines which connected with the interior conical well of the car. It was through this interior well that the gas which we had seen escaped, being given off by the driving element.

It has often been said that there is nothing new under the sun; but the author of this famous saying had never heard of Dr. Forscher. The driving element was literally new; not in the sense that it consisted of a hitherto unknown substance, nor of a new combination of old substances. It was entirely a new element, above uranium in the periodic system. It was appropriately called "synthium", being a manufactured element— the ultimate achievement of Dr. Forscher's dexterity in atomic physics. Not content with changing the elements one into another, he had added protons and electrons to the uranium atom, and created synthium. Undisturbed, its half-life period was a matter of minutes only, but if kept at an extremely low temperature its activity was greatly reduced. It was necessary to cool it constantly, as its very activity resulted in heat, and heat bringing more activity, it gathered speed like a rolling snowball, and was quite as apt to wreak havoc. Kept under control by electric refrigeration, however, it was a willing and mighty slave. It gave off molecules of gas which glowed with the heat of their liberation. They were given off in all directions equally, but those which encountered the walls of the conical container rebounded outwards. So great was the recoil of their departure that they easily lifted the huge tractor.*

The method of driving was simplicity itself, the chief difficulty being to retain the liberated energy within controllable limits. The synthium was allowed to attain a temperature of some three hundred degrees Centigrade**, and here it was maintained by the eight generators, which supplied current to a system of electric cooling. These generators were driven by turbines in the path of the escaping gas. When the tractor was to be brought down, more current was supplied, the resulting lessened discharge, which also affected the turbines, being compensated by the opening of valves which at full power diverted all but a fraction of the stream from the vanes. At rest, a slight discharge continued, which served merely to run the cooling system. When the machines were returned to their hangars, the driving element was removed to cold-storage far beneath the ground.

There were also in the engine room the gyroscopic balancers, and the necessary apparatus for renewing the air, which need not be further described. Above the engine room, at the apex of the cone, was the pilot house. It was practically sound-proof, and darkened save for hooded lamps over instruments which indicated the temperature of the driving element, the acceleration of the tractor, condition of the air, etc. A little to one side of the center was the tube of a small refracting telescope, which was used in long flights away from the moon to examine the path of the tractor and reveal possible obstructions.

We stayed but a moment, for the pilot house was sacred to its occupant, and since the corps of mechanics were now on board it was time to depart.

*Another illustration of Newton's Third Law of Motion.
**572° Fahrenheit.

(To be continued)

The End of Time

By Henry F. Kirkham

Seven Million Years into Time They Travelled To Discover The Fate of The Human Race!

I SAT up suddenly, startled out of a deep sleep by the unexplainable feeling that someone was very close to me, and that this individual, whoever he might be, had no right to enter my room in the dead of night. For a moment I allowed my eyes to become accustomed to the faintly luminous gloom of a moonlit night in midsummer. My attention had been focused at once on a shadowy figure seated in my armchair. I strained my eyes in that direction; then I reached my hand up to the wall behind me and switched on the room lights.

As the face and figure of the man in my chair leaped suddenly into prominence in the bright light, I gasped in amazement.

"Brown!" I exclaimed. "What in the world—"

Illustration by Marchioni

We were looking with amazement into faces that gazed at us without surprise and without emotion.

One of those mocking smiles which had always irritated me flitted across Mr. Brown's lips. He seemed to be enjoying my discomfiture.

"You who know me so well," he said, "should never be surprised at anything I may do. How I came here is of no importance. What concerns you is *why* I came here."

Instantly my mind flashed back across time to that terrible, that incredible adventure of ours in lost Atlantis, when Brown and I fought for our lives against men who had been dead ten thousand years! Of late months I had begun to doubt the whole amazing affair; I had begun to doubt the very existence of Brown, since he had disappeared completely, he and his house and his laboratory; and not even the blue mark on my finger, or the half-empty fire extinguisher on the wall could convince me that I had once actually saved his life by putting

out a blaze in his abode. Those who have read my* "Time Oscillator" will recall my undignified return to the world of today. When I picked myself up from the floor of my own laboratory the astounding Brown had vanished; and a man less scientific than I would have dismissed that fantastic journey backward into time as a freak of the imagination. All the weight of deliberate reason stamped the events as altogether outside the pale of probability. If I admitted to myself that such events *had* taken place, then I considered myself stark mad; and, naturally, I could not admit the latter assumption to be true.

The reappearance of Brown—I had almost said the apparition of Brown—came, therefore, as a blow at my very reason. But I realized, once and for all, that I really had gone back to Atlantis, and that this man sitting quietly at my bedside, with that cynical smile of his, was the wizard who had taken me there.

"Awake, my friend," continued the master of time. Then he chuckled: "How typical! Mankind sleeps, while the stars gyrate in the heavens!"

Accustomed as I was to Brown's bitterness, I merely smiled, and then got out of bed and donned a dressing gown. Between Brown and myself there were none of the usual formalities of handshaking. Such was the power of this remarkable man that the empty months seemed to vanish, and it seemed as though I had seen him that very day, and that we were resuming a conversation begun in the twilight.

"I called upon you ,in this rather informal fashion," began my friend, in his offhand manner, "because you are the only man on earth who knows me and trusts me. The truth is that I am about to embark on the most elaborate time-voyage I have ever undertaken. Before I go any farther I wish to know whether I can depend upon you as I have in the past — whether you are willing to accompany me on my greatest adventure."

Some of the old spirit of courage and daring, some of the old love for the bizarre, rose up in me, and I nodded.

"As my disciple," continued Brown, "I want you to share the dangers and joys of this adventure—and I warn you, there will be more danger than you have ever faced before. Compared to the trip upon which we are to launch ourselves, the journey to Atlantis was a mere visit next door, so to speak, and the dangers we faced were nothing. The dangers we are to face you can imagine. But the joy of this adventure will lie in viewing what no man has ever viewed before — the ultimate wonders of the time dimension. Watson" —he paused to give emphasis to what he was about to say—"I intend to venture even to the end of the world! To the end of time!"

The terrific possibilities of what Brown mentioned staggered me for a moment; yet not for an instant did I disbelieve him. Why

OUR human race, scientists tell us, is only a creature of his environment. As long as things go well, and nature is kind, he will progress. But if another ice age should come there is no assurance that he will not disappear and the supremacy of the earth pass on to the termite or the—cockroach!

But even granting that he can withstand the onslaughts of nature, he possibly carries within himself the seeds of his own doom. Just as an individual becomes mature, middle aged and then senile so it happens with a race and a species. Man is still now in the flush of his youth. But what will be the situation seven million years from now when his primitive strength is gone and he can no longer do such an elementary thing as bring children into the world? This fascinating story thrills by its vivid pictures of the human race AT THE END OF TIME.

*December 1929 issue Science Wonder Stories

should I hesitate, I who had accompanied him before, especially since I knew how he yearned for human sympathy—a common weakness among great men?

"Brown," I answered, trying to keep the excitement out of my voice, "no matter what you do you can count on me—to the end!"

And so Brown came once again into my life. Against my better judgment I felt bound to this strange man, and if I believed in Destiny, as do the Mohammedans, I would say that I had been destined to follow him to the ends of time.

I had projected into the future in Brown's first time machine, the same one which had taken me back to the French Revolution, and which had nearly brought me to my death in lost Atlantis. It was a far cry from that block of crystal in Brown's laboratory to the stupendous creation I was privileged to see a few weeks after the lost inventor appeared in my room that night in midsummer.

In a far mountain retreat, hundreds of miles from my prosaic office, I met the man of the time machine. Without ceremony he led me to a cavern that ran into the side of a lofty cliff, and there, deep in the earth, I came upon his laboratory.

HENRY F. KIRKHAM

"Brown", I said, with a smile, "you remind me of a gnome who performs his wonders underground, away from the light of men. Vulcan worked his forge in the darkness. The magicians and the alchemists seemed to think that darkness was part of their stock-in-trade. Really—"

"Never mind all that," said Brown, waving his hand at the amazing machine which stood in a natural grotto. In no wise did it resemble the time machine of our first adventure. That incredible creation which introduced me to the possibilities of the time plane and initiated me into the mysteries of time travel was a great block of pure crystal, illuminated by myriads of lights within and without; a cube which appeared to have an infinite number of cubes within itself, one inside the other. In spite of its divisions it was an entity, a single device. Brown's new machine appeared to consist of three distinct parts.

The core of the mechanism—if it can be called a mechanism—was in the form of a small hollow pyramid, surrounded by a winding glass spiral. Around both pyramid and spiral glittered a spherical globe of brilliant, transparent crystal. As the crystal globe radiated the light of the glowing arcs that were focussed upon it—lights which gave the time machine its boundless energy—I could not help laughing aloud at the impression which struck me. I was reminded of nothing so much as an ordinary goldfish globe, with a toy house in the center through which the fish could swim when they got tired of swimming around the bowl itself.

"You laugh," said Brown suspiciously. "Perhaps I should not have trusted you after all."

I hastened to reassure him, and explained the cause of my ill-advised mirth.

"You smile," he repeated seriously, "at a magnificent new conception. You are looking with amusement at the three mathematical symbols typical of natural laws,—the curve, the spiral, the apex. Nowhere in creation is the straight line a part of nature."

"What about the level surface of a body of water?" I interjected. "This surface is a plane, and a plane consists of an infinite number of straight lines."

"I was not speaking of planes, but of lines in and by themselves," answered Brown. "By means of these three visible manifestations I hope to penetrate the earth plane to a point far distant in the unexplored future—to a point where animate life shall cease to exist. That will not be the end of time; but as far as conscious

beings on the earth are concerned, it will be the end of time and the beginning of eternity."

"You mean—the end of evolution—the termination of processes which have been working themselves out for millions and millions of years? I don't believe it," I said, warmly. "I cannot conceive of the human race dying out unless some terrific natural catastrophe takes place—another glacial age, or the collision of the earth with some other heavenly body. And even then I believe man will be sufficiently advanced to turn back an advancing glacial period. Disease will be conquered by then —as a physician I predict it with confidence. Unless all the natural resources of the earth are exhausted, I cannot conceive of such a thing—and when they are exhausted, science will find a way to replace them.

"I have absolute faith in the future of man. I cannot understand how you expect to come to the end of the race unless you come to the end of the world as well—and in that case, it will be safer not to make the trip at all, for we will never return. Remember that in Atlantis we were nearly murdered by men who have been dead for a hundred centuries!"

To the End of Time

BROWN smiled wearily. "As I have never been to the end of time," he answered, "I cannot say with certainty when the human race will vanish, and when the earth will become a dead world; but this much I can tell you—that it *will* happen. You think of space as infinite, but space is curved. We can measure the curve. I believe in cycles. I believe the cycle of life on the earth has a definite limit."

Since it was impossible to argue on the point and get anywhere, I turned my attention once more to the marvellous new time machine. As I came under the glow of the battery of lights I felt the same abounding vigor race through me which had once before filled me with courage for a mad adventure. Undoubtedly, both machines had the same motive power. I mentioned this to Brown, who nodded. Then I explored the interior of the globe, so different from that cube in which we had visited the dim past.

As in the original time machine, I observed a camera obscura, a series of charts and electric controls, and a curious arrangement of mirrors. One piece of equipment especially attracted my attention. It resembled a portable searchlight—something like the powerful special lights on automobiles—and it was attached to what looked like a metallic helmet.

"What is this?" I asked. "I never saw it before."

"An atomic disintegrator," he replied. "One of my own inventions. It is more than likely we will need some deadly weapons where we are going, and since I couldn't take a battery of field guns I invented something better. This is a very effective weapon indeed. I have a theory of my own about the future races of man. I rather imagine that man will not progress as far as we think he will; and that at some periods in his history he will not progress at all. The cycle idea again. In case we run foul of a race of throwbacks, we won't be defenseless. Automatic pistols were good enough in Atlantis, but the men of the future will laugh at them. And even this disintegrator will be no novelty—but it's nothing to laugh at!"

"It will be a bad day for humanity," I said, "when a man of our generation has to help kill off the last human beings on earth."

"Let's hope it never comes to that," answered Brown solemnly, yet with a trace of his usual disillusioned mockery.

"Are we to wear the wire mesh suits we used at Atlantis?" I asked.

"We won't be able to frighten anyone with electricity a million years from now," said Brown meditatively, as though he thought of it for the first time, "but I've got them aboard. You never can tell what you'll need. For all I know we may run into a second Jurassic age, and we may be attacked by reptiles that will have to be taught to keep their distance. Yes, by all means we take the suits. And two automatics."

"What will we do," I asked, "if we find that the seas have covered the continents—as they did millions of years ago? Do you think we stand a chance of getting back?"

"That's part of the adventure," responded Brown, his eyes lighting up. "We may find a race of human beings who have accustomed themselves to an amphibian existence—I believe it's possible. We came from the water—why can't we go back to it? What will actually happen if we should land in the middle of an ocean I can't say—and what's more, I don't like to think about it. But since you think of so many objections to this trip—perhaps you would rather not take the chance? There is still time for you to change your mind."

Deep in my heart I knew I was setting out on a mad enterprise; for, whereas on my first trip I believed in Brown implicitly, in this case I was firmly convinced that he was wrong in his original hypothesis. But my idiotic pride, or my vanity, kept me silent, and I followed Brown into the time machine.

Almost before I realized it, he had sealed the globe and turned the control. I recognized the blurring of the lights, the sense of flying upward, away from the world, into a new, boundless, element. I seemed to spiral into space as the mirrors revolved with incredible rapidity. Against my will I had been projected headlong into the future, and at terrific velocity I was approaching the end of time!

A LOW chuckle behind me made me turn on Brown in a fury. But the utter calm of his countenance, and the careless smile which played around his lips made me remember myself in time. After all, he had never been wrong before, and it seemed as though I were fated to share with him one adventure more; the best, and, I hoped—the last.

"Now that you've got me here, you may as well show me how to operate this machine of yours," I said to Brown. "After all, something is liable to happen to you, considering the dangers we are to face, and I ought to have a chance to get back to my own world."

"Judging by your attitude," answered the omniscient Brown, with his bitter smile, "you wouldn't be sorry if something happened to me right now. I should have known better than to take you into my confidence a second time. You don't trust me any more; you think I'm crazy, and this time you think you have proof of it. Well, before this trip is over, I hope to convince you that I'm as sane as you are—and perhaps a lot saner."

"I'm sorry, Brown," I said, genuinely regretting by hasty conclusion. "Say no more about it. I'm with you here and I'll be with you to the end."

"That's the way to talk!" exclaimed the inventor enthusiastically. "And now that I know you won't try anything, I'll try to teach you how the machine works."

And for what appeared to be a long time, as the crystal globe tore through time to its inevitable destination, Brown instructed me in the intricate workings of his marvellous mechanism.

"I wonder if I can see that wonderful city again," I remarked. "You remember I saw one upon our first trip which seemed to be built of glass, and another that had a vast spinning globe in the center."

"We are far beyond those," said Brown solemnly. "We are two million years in the future as we speak!"

I gasped, and then turned to the camera obscura and flashed off the interior lights. A vast panorama spread before us. It was night upon the world. A full moon shone coldly on a vast city of gleaming glass, shining like crystal in the white rays. It seemed more like a continent than a city; for when one looks down upon a city from the air, he can discern its boundaries. But here, as far as the eye could see, was that one vast dome of glass, beneath which the teeming life of a nation pulsed and seethed. Through the mighty arched roof, which seemed to cover the entire earth, flashed the myriad lights that turned night to day inside the magic structure. The entire city, or state, or nation—we could discern no distinguishing characteristics—was one immense chain of structures, all connected, like the apartment houses we had left behind two million

years before. But these were of stupendous size, and it was quite evident that elevators were unnecessary, for any number of people rose from the glittering floor of the enclosure and apparently without effort, and in defiance of the laws of gravity, shot up to any ledge of apartments they wished to reach.

"They have conquered gravity," said Brown. "Apparently they use nullifiers. If I saw any wings I could explain the mechanism, but as it is, I rather think they have miniature atomic energy devices strapped to their backs, which drive them through the air." He adjusted the lens of the camera to obtain a clearer focus, and exclaimed, "I knew it! You can see they all carry something on their backs—something nature never put there."

"And I was right after all!" I joined in. "Didn't I say man would conquer the advancing glacial ages? Evidently this glass dome is used to protect the people from the elements. You can see the snow on parts of it. How they get their fresh air I don't know, but it's a pretty sure thing that human beings have learned to conquer the elements. I think you're wrong, Brown. Man will never die out!"

"You think so?" asked Brown. "Well, that remains to be seen."

CHAPTER II.

Into the Earth!

THE words had hardly left his mouth when he suddenly put his hand to his head, staggered, and fell. At the same moment the time machine gave a splintering crash and shuddered in every part.

I sprang to the controls to stop our flight through time. There was no need to do so. The machine had stopped of its own accord.

From the base of Brown's skull trickled a little stream of blood. Evvidently he had been dazed by a sliver of crystal. With my medical skill and with my first-aid kit, it was a matter of a few moments to restore him to consciousness. He sat up and looked at me accusingly.

"We can't be at the end of our journey," he said. "I might have known better than to trust you with the controls. Henceforth you will leave the navigating to me, and take the controls only after I am killed." He rubbed the back of his head ruefully. "A little farther down and you might have come to the last men bearing an unusual gift—a corpse!"

The inventor picked himself up and examined the controls. "I thought so," he said. "Smashed!"

"Does that mean—" I asked, feeling the blood leave my extremities and congeal around my heart.

"Does that mean that you are stranded out here in time?" mimicked Brown. "No, it does not. Your precious skin is safe. It means only that I must replace this delicate little mechanism with another—and I have only two. Thank heaven I exercised my usual foresight! Otherwise—but I am sure you can imagine the rest for yourself."

He opened a locker and from it carefully lifted a replica of the damaged control. "There is only *one* left," he said significantly, pointing to another in the locker. "You will please confine your activities to observation, not manipulation."

I was too angry to attempt to explain. Never in my life did I feel so impelled to express myself in blistering profanity. Brown's contemptuous treatment of me—as thought I were some specimen of imbecile—made me sorrier than ever that I had accompanied him. As the machine shuddered on its way I turned my back on him and walked to the camera obscura. Once more we were hurtling forward through centuries unborn, and as the glittering globe tore onward I gazed again into the future.

"You will probably notice," said Brown's mocking voice from behind me, "that the earth is growing colder and colder, and that the glacial areas are spreading. I am afraid we will soon come to the end of all life."

I glanced over my shoulder. Brown was not looking into the camera; yet he had predicted precisely what was happening before my eyes! As I watched I realized that the extinction of human life was inevitable; for even the glass cities I had seen could no longer protect man from the mortal chill

of a cooling earth and a dying sun. Dying the sun might not be; and yet the earth was cooling, losing some of the solar heat, giving way to eternal ice and perpetual gloom. The sun shone down at noon no stronger than the moon I had observed. Perhaps, I thought, the earth had been drawn from its orbit by another body, and was as far from the sun as Mars. But whatever the cause, the effect was plain. Not a living thing was visible. Everywhere ice, gleaming, smooth, cold, implacable; nowhere the cheering sight of a solitary creature that drew breath. Involuntarily I shuddered and turned away.

"You have stopped for a moment at two way stations on our journey," said Brown, with grim and almost inhuman humor, with an appalling callousness. "The next stop will be the last. Better get your baggage ready, because this is as far as we go."

"Why," I almost shouted, "you're mad! "You're a monster in human form! I wish I had never seen you or heard of your infernal machine! I—." I stopped. Something had happened. The time machine cames to rest with a grinding jar. But still I felt it moving—in what direction, I could not tell. I dashed to the camera and dimmed the lights of the car; and before my eyes the various strata of the earth seemed to pass in rapid, in bewildering procession. We seemed to be sinking, down, down, into the very bowels of the earth; past the outer strata, the deposits of the fern age, the fossilized skeletons of fabulous monsters; down, until I noticed a perceptible increase in the temperature. Were we heading for the center of a dying planet?

"YOU didn't expect this," chuckled Brown. "Did it ever occur to you that human beings could live inside the earth, as well as on its surface? We've reached the end of life on the earth, my friend; we're on our way to the last remnants of it beneath the surface. This was the best surprise of all," he continued, unable to restrain his mirth, in spite of the horrible things he tossed off so casually. "Well—who's crazy now?"

"Brown," I said, my hatred and contempt drowned in sheer admiration, "you're the greatest genius the world has ever known—but I wish I had never met you, and I wish to heaven I had never made this horrible journey. The thought of what mankind is coming to, the idea that glorious man, with all his magnificent achievements, is coming to this refuge under the earth, the idea that the sun will go out of human life, and that only hideous cold and darkness will remain, is too much. It will haunt me the rest of my days. I would rather be an ignorant South Sea Islander, laughing at the sun, secure in the knowledge that my descendants will laugh in the sun for generations to come, than the greatest scientist in the world, working on with the realization that all my discoveries will come to naught, and that everything I do for mankind, and everything mankind has ever done, will some day disappear in the eternal ice of a dying planet."

"Bravo!" exclaimed Brown, smiling cynically and applauding at the same time. "Excellent! And now that you have delivered yourself of a sentiment such as the world has never heard before, you may as well realize that you will have very little time to be haunted by anything, least of all by an idea of what the world will come to in seven million years! Please realize that you are at the end this very minute! If you don't live to return to your own world, you won't have to worry about this. And what's gotten into you? I thought you were a man of science, an explorer in the abstract. I've been talking this way only because it seems you have been metamorphosed into a sentimental fool, rather than an alert man of science. Pull yourself together—there's enough to do right now without weakening. You were a strong man in Atlantis—don't fail me now!"

"Oh, so that's why you acted so strangely," I said, rather relieve at his outburst. "I was about to ask what had gotten into *you*, to change you so. However—." . . . . What I was about to say was obvious, but I never said it. As we stood facing each other, in the midst of the crystal globe, the walls of our time machine seemed to melt away into invisibility as a red glow all around the device grew stronger and

stronger; and we found ourselves lookking with amazement into a ring of venerable faces that gazed at us without surprise and without emotion.

"We have arrived!" exclaimed Brown, with his old laugh. And, gripping my arm as if to reassure me, he stepped boldly forward, and drew me after him into the enchanted circle.

"Wait a minute," I said. "We've forgotten the automatics and everything else. I don't fancy going among these ghosts empty-handed."

"Well, we can't go back for anything now. Don't forget for a moment this isn't Atlantis; it's the very opposite; and any false move on our part may result very unpleasantly—for us."

I cast longing eyes at the atomic disintegrator; and somehow I didn't feel completely dressed without my holster and its deadly black burden. But a number of expressionless pairs of eyes were upon me; they seemed peaceful enough, but I was taking no chances with the advanced science of the final product of human evolution.

Meanwhile, as at Atlantis, the time machine had vanished. Had I not known from past experience that it was still there, invisible, I would have given up all hope of ever returning to my own age. Brown, apparently oblivious of everything else, was studying the quiet figures before him. Into my mind flashed a thought which I am sure was duplicated in his: that these strange men were robed very like the ancient Greeks and Romans, in the toga; and that the similarity was heightened by the sandals they wore strapped to their feet and ankles. It was a most remarkable resemblance.

"Perhaps we've unwittingly gone back to the time of Plato," I whispered to Brown. "Or we may be in the presence of Cicero. These outfits are pretty familiar."

"Nonsense," he said, sharply. "No Greek or Roman ever had a head such as you see here."

And indeed he was right. No ancient, not Aristotle himself, could possibly have possessed the cranial development of these silent figures. And surely no one, in those times of sunlit paganism, appeared so inhuman, so free from passions and desires; no, not Plato himself, who is said never even to have lost his temper in eighty years of life. What was most curious, they had uttered not a single word since our arrival. As I had remarked to Brown, they were more like ghosts than men.

A World-Weary Race

As if reading my thoughts, Brown suddenly exclaimed: "I have it! They don't ned to talk—they have developed thought transference, and by this time they must have agreed among themselves as to who we are, where we come from, and to what species we belong. I feel as though I have been catalogued in a dozen different minds."

Always a good psychologist, Brown was willing to let the other side make the first move; and so he simply held up his right hand, palm outward, in the universal gesture of peace and friendliness. As this was evidently meant for them, the silent spectators raised their own finely moulded hands in a similar salute, and then slowly lowered them and remained looking at us in the same owlish silence.

I felt tempted to laugh. The situation was more than ludicrous—it was a perfect comic opera setting. There is nothing that can be so disconcerting, and at the same time so farcical, as a silent examination by a group of total strangers.

When the silence reached a point beyond the power of human beings to endure, I cast all discretion to the wind and announced, in a ringing voice: "Lafayette, we are here!"

Brown himself smiled; and an individual directly opposite me advanced immediately and seized my hand. A curious affinity seemed to spring up between us. Travelers who had been through India used to tell me of the remarkable feats of the Hindu jugglers. Some of these magicians can communicate, by genuine mental telepathy, with people hundreds of miles away, and deliver messages to them in that manner; but first they must be "in sympathy" with them—that is, they must have had physical contact. A clasp of the hand, for example, would be sufficient to establish the "rap-

port" between the juggler and the subject. So it was with me and this man of the last race of men. The moment our hands clasped, a subtle electrical connection seemed to be established between us; and I felt distinctly the influence of an extremely powerful intellect working on my own. Brown probably realized what was going on, but he merely watched me; evidently he wished to see what would happen before he himself submitted to the process.

Thought images were flowing into my mind, clear-cut and unmistakable; and though I could not translate them into words, I received the unmistakable impression that the man looking deep into my eyes with ancient, world-weary orbs was offering me welcome. I seemed, also, to catch the impression that a long wait had come to an end, and that Brown and I had appeared on the scene in time for something momentous.

"I think they're friendly," I reported to Brown, "but don't try to pose as a god again. They won't fall for your bluff."

Brown did not notice what I said—or he pretended not to. Instead, he displayed once more his amazing knowledge of root words, as he had done at Atlantis. Apparently he was asking a question. The men looked a trifle surprised; then one of them clasped his hand and it was obvious that my companion, also, was receiving thought images. I saw him nod; then he beckoned to me; and Brown and I and the welcoming committee moved off in the direction of a powerful light.

"It seems they have been expecting us," said Brown, "and before we go any farther they want us to undergo a treatment which will purge us of some of the taints of our gross twentieth-century bodies. Apparently they are afraid we will bring them some forgotten disease. I don't believe there's anything to be afraid of."

Brown and I were delivered to the care of two attendants arrayed in curious protective garments, who conducted us into a small chamber in an edifice of some gleaming material unknown to me, and shut the door on us. Instantly we were conscious of the action of powerful, invisible rays. I felt as though a mild electric current were running through the body. I was filled with a sense of exalted physical vitality. The years seemed to fall away; it was as though I sloughed off my former skin and assumed a new one more easily than a snake sheds its old coat. As a physician, the process aroused my curiosity. Could I but carry the secret back with me—that is, if we ever found the time machine, which had disappeared—what a wonderful addition it would make to the medical lore of the twentieth century!

THEN we were forced to submit to a change of attire. I felt ill at ease in my fluttering toga; but Brown seemed to enjoy the experience, and, when he was completely clad in the curious garments, he looked remarkably like an Athenian of the golden age of Pericles. I had never noticed before how finely cut were his features, or how imposing the cast of his head.

"Have you noticed," asked Brown, "how terribly old these men are—how their eyes seem to be weary with the weight of centuries? I think we have fallen among people who realize they are the last men, and who have learned to prolong life indefinitely. One thing I have not noticed—have you seen any young person, or persons who might, by a stretch of the imagination be considered young?"

"No, I haven't," I answered. "We seem to have come down to a race which exists in a state of senile decay. In Atlantis there was youth, and beauty, and strife, and hatred, and war. This place reminds me of the more repulsive ideas of heaven I acquired many years ago. Every inhabitant of that blessed abode was venerable and saintly, but unless I'm very much mistaken, these old men are the very opposite of saintly. They eyed me as I myself might eye a culture of scarlet fever germs. And in more than one world-weary eye, as you term it, I rather think I detected a glitter which reminded me of a cat looking at a mouse."

"I got the same impression," agreed Brown, "but we must never allow them to realize that we know more of their characters—if they have any—than we did before

we landed. Our best bet is to act gullible and innocent. Now that I've seen what the last men will look like, I want to find out just a little more about them before we go back."

"If we ever get that far," I amended. "And if we ever find the time machine again."

Brown suddenly smote his forehead. "By Jove! I thought I had forgotten something! They surrounded us so suddenly I didn't have a chance to mark the place! I laid stones in front of the machine in Atlantis. As far as I know, I didn't mark the spot here at all."

As Brown spoke, I felt myself growing pale. And while he realized the seriousness of our situation as well as I did, it was not his custom to give way to qualms and quakings. "We may find it again," he continued. "I have a pretty good idea where we left it, but of course, most places look alike down here. We may not need the weapons, but how will we ever get back to where we came from?"

"Perhaps we can live here forever and let time catch up with us," I ventured. "I am convinced those rays are used to increase the life-span. I should say that the fellows we have seen are centuries old—each one of them."

"Very probable," said Brown. "They remind me of changelings. You remember the story of the Irish woman whose infant was stolen by the fairies—Irish mythology is full of them. In place of the human child they left a fairy changeling which was its exact double. But the mother knew at once what it was simply because, out of its innocent face, looked malicious eyes that burned with the knowledge of fifteen centuries. Well, that's how our new friends appear to me. Their faces are innocent, but their eyes give them away. I wouldn't be surprised if they tried to experiment on us, just as we use frogs for vivisection."

CHAPTER III.

The Intercepted Message

OUR two attendants approached and Brown addressed them in English. They continued to stare, and he tried the other European languages with equal failure. Then he went back to his root words, the same he had used at Atlantis, and I detected a glimmer of recognition in the deep-set, tired eyes.

"You notice," said Brown to me, "that the fundamentals of language scarcely ever change." And, just as he had spoken to the men of the lost continent, so now he spoke to the survivors of the last race. As we walked toward what was apparently the council chamber of this underground race, he talked easily and surely with the amazed centenarians, whose answers, in low, flat monotones, seemed to please him immensely. I gathered from what he let drop at intervals that speech was not their usual method of communication, as they had developed thought transference to a degree unthought of in backward times like our own.

"I was right, after all," said Brown, between pauses. "It seems they have been expecting our arrival. I presume they, too, have mastered the mysteries of time. When the glacial age became so destructive to life—in spite of their cities of glass—the more enterprising members of the human race, with untold centuries of science at their command, turned to their last refuge. Some of them ventured to other planets—some to Venus, some to Mercury; but they were never heard from, and the great mass of the people were compelled, through force of circumstances, to follow the lead of their greatest scientists and delve beneath the earth for their only certain shelter against the advancing age of ice. We may hear a great deal more a little later. I have my own theory as to how they got here, how they live, and how old they really are. But one thing I cannot understand—why they should act as though they were expecting us, and why they should be so unusually happy to see us. It seems to me as though they were waiting for someone to put to their own uses."

The council chamber, if that is what it was, looked like any other immense room—except that it was equipped with devices I had never seen before; that it had an arti-

ficial heaven, in which glittered stars so realistic I had to rub my eyes before I realized we were not in the open air above the earth at night; and that at one end was an enormous astronomical device, something like the planetarium I had seen in Chicago in my own time. Through this I was to learn later that the earth had changed its course, and that the stars, constellations, and planets were not where I had been accustomed to look for them.

Some had changed their places entirely—that magnificent spectacle known as the Southern Cross was one of them—and others were obviously on their way to oblivion. I do not say the stars were dying; but perhaps the erratic course of the earth made it impossible for them to be seen.

More astounding still, the windows of the room looked forth on what appeared to be a wonderful garden of tropical foliage. It was more than a garden; it looked like a tiny jungle, with the trees and the flowers gone wild. I fancied the palms were stirred by a gentle breeze. But I felt sure that this vision was, like the starry heaven, an illusion. I did not believe it possible that any sort of plant life had survived the subarctic cold of the earth's surface. I was ready to admit that this world underground had ample light and moist, balmy air, all under perfect control, it appeared; but I saw here a flat contradiction to the science of my own day, which assumed that the lower orders of life could endure longer than the higher.

The entire display, I felt, was for artistic reasons; a nostalgia for the ancient heritage of man, lost long ago; the sun, the skies, the pure air, the winds, the seas, the sweet smell of young grass and budding flowers. And yet I knew these things had been denied them time out of mind; and again I wondered by how many centuries each man reckoned his age.

MEANWHILE Brown, as spokesman for the adventurers of a backward age (as the venerable inquisitors termed us) was speaking familiarly to the most impressive specimen of humanity I have ever seen. The ancient root words stood him in good stead; and where his language failed he seized the other's hand and they understood each other perfectly at once. Brown was so absorbed in his conversation that I deemed it wise to keep myself in the background; and after almost a half hour of palaver, during which the leader and several of his companions had addressed themselves to the time wizard, I saw Brown suddenly seize the right hand of the chief, and the left hand of the man who sat next to him.

I was mystified, and drew nearer my companion to be with him in case of trouble, although, unarmed as I was, my aid would have been in vain. Brown still retained the hands of these two men; and as he spoke, uttering words that he seemed to have memorized, I saw a look of amazement cross his face, and then a frown of perplexity.

The magnificent brows of the last men gleamed in the soft, cold light; their amazingly large crania, covered with silvery hair, nodded slowly and impressively at every pause. And still Brown held the hands of the two men as he talked into the air. These two seemed not to be listening to him, whereas the others appeared to pay attention.

As Brown stopped speaking—for lack of anything further to say, I imagine—the conclave rose. He dropped the hands he was holding and stepped back to where I had remained. "The plot thickens," he announced laconically. "These fossils are not as saintly as they look—not by a long shot. I rather admire their brains, though."

"What were you telling them?" I asked.

"Oh, the usual thing—that I come from another age, millions of years back—which they understand perfectly. They have been expecting someone for centuries, and they are surprised no one came before this, in view of the fact that they themselves know so much about time travel. When I asked them why they didn't travel back to a warmer age, they declared that, while they knew it was quite possible, their time expert had departed this life, and they confessed frankly that, with all their millions of years of science and with all their tremendous brain power, they were incapable of con-

structing an apparatus which would take them all to a milder period of history. Quite a compliment for me, I think."

"You should be flattered," I answered. "Did you offer the use of your own machine?"

"Am I insane?" asked Brown. "I want to get back some time myself—I want them to forget all about my own invention. They may decide to keep me here to build one for them, and I don't think I can do it."

"Then why did you suddenly become so affectionate as to grasp the hands of those two old fellows?"

"Ah," said Brown, with satisfaction. "This time I have put one over on them. I told them that I was honored beyond words to be the first to grasp the hands of the two leaders of a race so advanced. You may have noticed that I recited something I had memorized. And you may also have noticed that they paid very little attention to me. Allowing me to hold their hands was an act of diplomacy on their part. I must find other occasions for hand-holding. It's too bad there aren't any pretty girls here. I might have a legitimate excuse if there were."

"That reminds me," I said. "I haven't seen any women."

"Oh, they probably exist," said Brown. "But what I learned is of more importance. You know they communicate by telepathy, which in this place is an art and a science. Well, holding the hands of both of them, *I intercepted their messages!* And all the time they were pretending to listen to me, they were in reality deciding that you and I were to go on a long journey to some other race in this underground world—and unless I am very much mistaken, we are to go as hostages for something!"

"Hostages?"

"I only think so," said Brown. "We will find out very shortly. I have an idea I can worm some information from one of our guides. I will ask them to take me on a tour of the place, and if I find out what I imagine I'll find out—that is, unless they are too wary for me—then I'll know that I'm not making any mistake."

I found I was growing sleepy, and Brown, too, was wearied by the events of our journey. But nowhere in the spacious halls did we find anything approximating a bed. Brown soon learned from the attendants that sleep had been mastered thousands of years before, and that the last men required none of it. I suppose their ray treatments removed the poisons of fatigue. At any rate, Brown and I stretched out in the most convenient spot, and our guides, understanding perfectly what troubled us, withdrew and left us to our slumbers.

A Struggle For Existence

THE next morning—I call it morning simply because I'm used to it, although there was neither night nor day in that phantom land—we were fed on capsules containing high-powered food content. I discovered that our hosts ate on an an average of twice a week, and as a physician I could understand the state to which they had brought themselves.

On our tour of inspection—on which Brown had insisted— my companion spoke easily and carelessly to the guides, leaving me to take my notes alone. And everywhere was ample evidence of the wonderful mind of man. The atmosphere was supplied as I had imagined—vast pumps, of a size and structure unknown in my own day, drew in the clean, cold, air at one opening in the earth's surface and expelled it at another under high pressure. Everywhere the illusion was preserved that the inhabitants of Ultima—as Brown termed it—were walking on the surface of the planet.

The earth enclosure was artfully disguised, giving the illusion of vast distance, even to the mirage of a horizon line, with trees and buildings standing out against the sky. How much labor must have been expended in the construction of this underground world staggered the imagination. I understood, however, the motive for all this: The last men, realizing that their hour had come, had devoted themselves to work, as the only means of keeping alive their spirit, the the only salvation from the maddening realization that with them the human race, the pride of the universe, had reached its

last representatives. And so these inhabitants of a place which never knew the sun, fabricated for themselves cold light from myriad sources which replaced the blessed light to which I was accustomed; and in their planetaria they set suns which never ceased to throw their light on the surrounding planets.

The broad streets, designed obviously for air space, were almost deserted, in spite of the fact that once a populous race must have passed over them; people who walked from these thoroughfares into tunnels for quick transportation to other parts of the city. Evidently the last men had returned to the realization that walking was not an evil unmodified; for they encouraged this mild exercise on every occasion, and reserved incredibly swift mechanical transportation for long distances. Yes, the race was shrinking; for while I saw aged countenances everywhere, the faces of men who outlived Methuselah, nowhere did I see the erect figures and the radiant countenances that denoted youth.

Brown, observing all this, shook his head sadly. "It's a pity," he repeated, again and again. "It seems they are unable to reproduce. A race of young men, with the scientific knowledge of their ancestors, could yet make this planet the proud home of man."

"Have you discovered anything?" I asked. "Anything that concerns us, I mean?"

"Nothing that concerns us directly," he answered. "But I am putting two and two together, and I rather imagine the result will be four. I have learned that there is another race living underground here—on the other side of the planet, as far away as possible from this one; an inferior race, regarded with contempt by the people among whom we have fallen; but a race which, of course, is far ahead of our own. These people, whom we have never seen, outnumber our kind hosts ten to one, and as far as I can gather, there is no love lost between them."

"Why can't they live together in amity?" I asked. "I should think that at the end of the world, all personal enmities would be forgotten in the struggle to maintain the race of man on or in the planet as long as possible. Why should there be any hostility between the last two races of man?"

"Why?" echoed Brown. "Well, I admit there shouldn't be. One would think the brotherhood of man would reach its highest point now, if ever. But I adhere to my cycle theory. I believe that as the circle closes, as the last point on the circle moves toward the first, differences are swept away, and the last men become like the first. Oh, I don't mean primitive; I mean that in spite of all the science of the ages, the essential nature of man has not changed, sad to say; and while all men may have been brothers a couple of million years ago, the spirit of nationalism—call it that for want of a better name—is still rampant.

"The superior race, instead of aiding and uplifting the inferior, despises it; the inferior race instead of trying to imitate the other, instead of working its way into its good graces, merely hates and fears. And so it stands. The same old situation all over again, from the moment one man showed his superiority over another—the same old enmity that existed between the Neanderthals and the Cro-Magnons. I think my cycle theory is right."

THE guides were beckoning to us again. "Drop behind," ordered Brown. "I've got to discover some more about our unseen friends on the other side of the world."

I walked slowly after him, trying to appear indifferent to what he was saying. My own attempts at conversation were carried on by telepathy, which was quite easy as long as I held the hand of the guide. I must have cut a ridiculous figure, walking hand-in-hand with this patriarch, like a child with its nurse.

After showing us around the outward battlements of the city, our guides escorted us to a building which seemed to contain nothing but elevators. We shot up at dizzy speed—miles, it seemed,—and emerged into the most splendidly-equipped observatory the human mind can imagine. The elevator had been run through a mountain peak, and this observatory, high above the surface of the earth, was the last point of contact with the outer world.

Here a few fortunates, protected from the intense cold by a great dome of crystal, so vast that the giant telescopes worked within it, and so clear that visibility was not interfered with in the least, surveyed the heavens. Instruments unheard of in my time noted and recorded the slightest variations in sidereal and stellar motions. For centuries this system had produced the most complete and minutely accurate system of star maps in existence; and so powerful were the telescopes that these men of the future had been able to study animate life on the nearest planets.

Mars, I noted, had sustained life of a high order long past my time-dimension. Venus supported a limited life cycle of a low type. But at the time I saw these charts, Mercury, the only planet suitable for anything like human habitation, in view of the waning powers of the sun, had developed a system of life and evolution similar to what we know of the beginning of life on the earth.

Ten planets were listed in all—eight of which I had known; one had been discovered in my life-time; and as for the one unknown to me, I could not doubt its existence. It was to this observatory and its calculations that the planetaria beneath the earth's surface owed their superhuman accuracy. At any period, the marvellous mechanisms miles beneath this mountain-top contained exact replicas of what the astronomers recorded. Wireless telephony, television, and mental telepathy all combined to keep the lower astronomical stations accurate to the fraction of a minute. Through these recordings, also, I learned that my old friend the North Star no longer occupied his place as a cardinal point, but that he had been replaced millions of years before by another sun.

"What is the use of all this?" I asked Brown. "With the exception of the astronomers no one here ever sees the stars. Why, then, all this trouble to map the heavens day after day, when the race is dying off?"

"The will to live, probably," said Brown. "Even though they know the race is dying off, they still remain men, proud to the last. But they have one hope—they have a means to continue the race, if only they can lay hands on—or rather, if they can get enough of—a radioactive substance of unusual properties—a substance of which I never heard before."

"How can they use this to reproduce?"

"Well, as I see it," answered Brown, "their females are too old and too sterile—through long habit—to be of any use in that respect; and as you saw, the men themselves are entirely too aged. But for centuries they used ectogenesis*—and this substance will either fertilize the females, unattractive as they are, or else it will react on, let us say, a uterus which has been separated from the body. In either case the result will be the same."

"I heard something about that back in our own time," I answered thoughtfully, "but as a physician I could never understand how the offspring could develop away from the mother's body—without the necessary blood stream to nourish it."

"Apparently things have developed in medicine since your time," said Brown. "But the important thing—as far as we are concerned—is something else, something only remotely connected with this method of producing life. What I have discovered is that this radioactive element is used to manufacture the food capsules, and that only a certain amount of it is allowed for food and for use in the ray treatments."

"What do you mean by 'allowed'?" I queried. "Who can say how much or how little shall be taken?"

"Have you forgotten the other race I told you of?" asked Brown, with his irritating smile. "It appears that this radioactive deposit, while very large, and consisting of something I never heard of—Something indeed discovered only a thousand centuries ago—is the last of its kind in the earth. The Plutonic regions have been pretty well searched, and this is the last source of life. Well, the hostile race is afraid that if our old friends get an oversupply of this element, they will fertilize their females, or produce offspring in the other way I mentioned, and that will be directly contrary to

*A Method of breeding children apart from the body of the mother.

their interest. You see, like all inferior races, the one I am speaking of fears an increase in the superior race. They are afraid—needlessly, perhaps,—that with an increase in the population, the greater race will fall upon them and exterminate them, taking for itself the radioactive deposits which are vital to both races. Even here the law of the primitive holds good. Self-preservation is said to be the first law of nature. Apparently, it is also the last."

"And you say this alien race outnumbers the greater at least ten to one?"

Brown nodded.

"Then it requires ten times the amount of the element that this one requires?"

"Your reasoning," said Brown, "would do credit to a Newton. "Such, indeed, is the case."

"Then why doesn't this lower species exterminate the higher and keep all the mineral for itself?"

"Ah," said Brown, "there you have it. Our friends run the earth—what is left of it. Without their science, I doubt whether the other race would survive very long. Our guide has informed me that we are going to see something more wonderful still. I imagine that the scientific work done here keeps their enemies from falling on them. As far as I can judge, the matter was fought out not very long ago—only a few centuries ago—and both sides realize the futility of further loss of life. The superior weapons of this side just about balance the superior number on the other. A sort of armed neutrality exists. An increase in the population here would mean war, and the final destruction of one side or the other. And so the circle goes, one point leading to another, and all leading back to the beginning."

"But where do we come in to act as hostages, as you said?"

"That," said Brown, "I haven't thought out yet, but I have a pretty good idea. I'll know it before long."

CHAPTER IV.

Hostages!

ON our way down in the elevator I thought it prudent to change the subject. Wherever I went, I felt the cold eyes of my guide upon me. It was as though he were looking through me into my inmost being.

"Did you notice the two planets with rings around them?" I asked Brown, as we shot earthward.

"Yes," he answered, "and one of them is the earth! At this moment the earth has a ring like Saturn, and the moon has vanished from the heavens. You probably know that the moon receded from the earth, and then approached it, and that at a critical point the gravity of the earth and the gravity of the sun, acting upon it, split it apart, and its fragments formed an orbit around this planet. Shapley was right, after all."

The elevator had reached the underworld; but instead of stopping, it continued downward, until the heat became almost unbearable. And there, perhaps, was the ultimate achievement of man, the tapping of the incalculable supply of heat still remaining in the depths of the earthcore. What had been a great dream in my own day was an everyday reality here. In an enormous cavern illuminated with cold light—a cavern beyond the black confines of which red tongues of flame writhed and roared as they had in the imagination of Dante—gigantic, polished, engines throbbed to the terrific power pulsing, even then, through the center of the icy planet. What a contrast!

What purpose the power generated was put to, I did not imagine at the moment, unless it was for driving the vast air pumps and for assisting in the manufacture of the artificial, moistened, atmosphere. But I noted that whatever work was necessary was performed by robots of superbly ingenious construction, working in heat which no human being could long endure. And then we were shown one of the most amazing feats of engineering in the entire underground world. It seemed incredible that Brown could be talking of his own unimportant affairs when he viewed the magnificence of the achievements of the last men.

I had long known that the earth, as it rushed through space, generated millions of volts of electrical power, and that this power flowed around it in a great stream. To harness this intangible and yet tremendous

force would have seemed out of the question; and yet, as their supreme achievement, the last men had done just that.

Brown and I were shown seven immense helices of tightly wound wire that extended upward, it seemed, for an infinite distance. These were the bases of seven mighty hills that, in happier days, had been wrapped in the copper coils—wires of a nature to excite the magnetic fields induced by the fields of the sun. That immense and perfect dynamo, the earth, the nearest approximation to perpetual motion, had been harnessed to keep alive the men who had vanished from its surface. The incalculable electrical energy derivd from the rotation of the earth was put to working the machines that tapped the earth's heat, and these, in turn, giving power to so many other devices, in reality made life possible. And so at the very end, man had cheated the earth which had cheated him of life on its surface my making its very vitals serve his needs. One thing alone he could not do—and that was reproduce his own kind. The most elementary function of nature he could not perform!

When Brown and I returned to the council chamber, we were informed that our education was not yet complete; that we were to take a journey to the people on the other side of the world, and that we would remain there for some time. Brown winked at me. I began to get the drift of the arrangement.

As I understood from what Brown translated for me, we were to be shot through a long, straight tunnel in a magnetic car drawn forward with incredible rapidity, by powerful electric currents. Although the world under ground had been pretty well hollowed out, making it possible for one race to attack another in deadly combat, rapid transportation was still carried on through tunnels. I understood that one tunnel led directly to the deposit of radioactive material, and that at regular intervals both races sent out cars for supplies. These times were agreed upon in advance; and as an evidence of the absolute trust the last two races of men reposed in each other, the deposit was protected by an array of photoelectric cells and television devices, making it impossible for one party to carry away the element without the other knowing of it. This, then, was what prevented my hosts from stealing enough of the mineral to cause reproduction. But something told me that was not enough.

"I see it all now," said Brown, "and I must say it's devilishly clever. Our old people here must send two of their members every period as hostages, with the understanding that if they try to abstract any of the stuff, the hostages will be put to death. The old Roman idea all over again. The only reason they don't go back on these two victims is that human life here is so terribly precious, it isn't worth the risk to cause the death of a great scientist simply to bring about the birth of a lot of potential scientists."

"Then that means . . . ." I began.

"Exactly," said Brown. "With these robes, and with the benefit of the ray treatments, we resemble them to an amazing degree. These enemies of theirs will never know the difference. Our good friends can steal all the stuff they want, and you and I will pay the price! Capital! I wonder whether that was why they welcomed us so eagerly!"

"This is what comes," I said bitterly, "of trying to put your wits against creatures millions of years in advance of you. What are we to do now? We can't escape to the time machine because we don't know where it is; and even if we did know, I doubt whether we could get away. I never dreamed that I was to die seven million years after my time!"

"Oh, I'll find a way out," said Brown easily, with superb self-confidence. "It would be easy enough if we had our weapons, but this adds a little more fun to the adventure. Imagine escaping from the future and returning to the past!"

"You're only saying this to keep up my spirits," I answered, gloomily. "You don't believe it yourself."

"I don't, eh?" asked Brown, with his contemptuous smile. "Then look at this!"

From beneath the folds of his toga he drew a long sliver of crystal, strong as steel and sharp as a needle. "You don't think I

let myself go unprepared, do you?" he sneered. "Those who accompany us are going to get the surprise of their lives. I don't suppose anyone has been stabbed down here for ages, but I intend to introduce an innovation."

"Put it away," I ordered, looking hastily around. "You won't get anywhere with that. You haven't a chance in the world."

"Now you listen to me," said Brown, "and listen closely. "When we get in that car we're as good as dead, unless we can convince the people at the other end of the earth who we are, and what sort of a trick is being played on them. I have an idea that they're not such a bad sort after all. But I don't want to do that. I've seen as much of the last men as I want to, and I'm satisfied. I don't mind not seeing the other race—I can imagine what it's like. My only desire is to get back to our own century, and I'll get back there if I have to kill off every man in Ultima!"

Already our diplomatic hosts were approaching us, laden with curious objects. "*Timeo Danaos et dona ferentes,*" chuckled Brown.

"What?" I asked.

"Don't you remember your Latin?" asked Brown, in amusement. "I fear the Greeks—even when they come bearing gifts.' If these fellows don't look like Greeks bearing gifts, then I don't know anything. If they were besieging a town, I would expect to see a wooden horse!"

Our ancient friends led us to the mouth of a large tunnel, and indicated to us a curiously shaped car, completely enclosed on top by a covering of crystal, which reminded me faintly of the torpedo-shaped racing cars favored by Barney Oldfield, of revered memory. The car stood on a shining metal track, like a monorail affair. It was apparent that a large wheel beneath the center of the vehicle was the only means of propelling it; and while I sought for a rocket attachment, I saw none.

ALREADY two of the Ultimates had taken their places in the machine. Brown and I, in the face of a score of ancients, who looked remarkably vigorous for their age, and who undoubtedly had weapons concealed under their flowing robes, thought it the part of wisdom to enter also. Into our hands they thrust curious vessels of a metal like beaten gold—probably peace offerings to distinguish the hostages from their conductors.

Brown, sitting next to one of the guides, watched intently as his companion pressed down a lever. The car seemed to spring forward. There was none of the backward pull of inertia, in spite of the fact that the pull of gravity was greater, because we were closer to the center of the earth than are the trains of my own generation. I could not realize the speed at which we were traveling; first, because there was no noise, second because there was no vibration, and third because, whenever I looked through the windows, the blackness outside remained uniform—I could see nothing rushing past. The car, I judged, was balanced by gyroscopic control which derived its power from the track.

I began speaking to Brown in the most natural way in the world, taking care not to touch my guide, and hoping I would not be understood.

"Suppose we overpower these two birds and make them take our places?" I asked. "Then we could bring the car back ourselves with some sort of story."

"I thought of that," said Brown, "but I have a better plan. I don't think I can get the other people to attack our friends; they wouldn't believe me, and they would only imagine I was drawing them into a trap. With men of superior intellect it doesn't pay to attempt ordinary means. I want to get hold of some of the weapons our hosts have hidden, and I think I know a way to do it. This isn't Atlantis, don't forget; here it's brain against brain, and mine is the second best, by a long shot."

I remained silent, and Brown engaged his companion in conversation, pressing one line of questions. The other stooped and drew from beneath the seat two peculiar objects. I had never seen their like before, except in museums. They resembled nothing so much as the corselets the knights

used to wear when they went forth to kill dragons and to knock their opponents from their horses. But I knew very well that these devices were something different. Brown seemed to be intensely interested; he toyed with it, examined it, and finally tried it on. It covered him from throat to waist.

"This is used to ward off the peculiar bullets they use down here," he explained to me. "It will be handy to have around when things start popping. I understand that our not-so-distant enemies have weapons like pistols from which they can shoot devastating rays—some sort of concentrated cathode ray, I imagine. These rays are effective at a distance, and when they don't kill they exert a paralyzing effect. These protectors turn the rays aside. They neutralize them. My guide tells me that the rays of our enemies are not as deadly as the explosive bullets of those we thought were our friends. I must get hold of the latter weapons—they'll be very important to us.

"Meanwhile, I must say I am terribly disappointed—I really expected something unusual in the way of a deadly device. Why, even in our own backward day men had learned to kill each other on the mass production principle! I really don't know what the world is coming to!"

On Brown's face was his most cynical smile. He seemed to enjoy his grim jest. I took heart at his attitude; it always presaged that he had found a way out of our difficulties.

How long we were traveling I do not know; it may have been an hour, or it may have been two, or three; but the car halted as suddenly as it had started, as we rolled into an illuminated open space. A group of men, looking more vigorous and a great deal younger than our late hosts, stood awaiting our arrival. I noted that they were all armed—another graceful tribute to international amity—and that in their midst were two men of the race I had just visited. Evidently these were the hostages that were to be returned—in exchange for us.

Brown turned to me with a smile. "Be ready to leap into this car at any moment," he said, in the most matter-of-fact way. "This is the most exciting game of chess I was ever in."

CHAPTER V.

Cornered

WE alighted from the vehicle and approached the group of soldiers, who in turn advanced to us. Our guides addressed them in their own language; Brown handed over the gold vessels; and the two former hostages prepared to take our places in the car. As I stood on one side, I was amazed to see one soldier and then another crumple silently to the ground and lie still!

It was all over before I could realize what had happened. They fell like ninepins, tumbling over each other in grotesque heaps, and I could swear I detected a look of astonishment on their faces! The last man standing faced Brown and reached for his ray pistol. Brown laughed as the man's hand closed over an empty holster. The next moment he, too, lay on the ground, and before our astounded friends could say a word, they, also, had joined the platoon of the silent and the prostrate.

Brown surveyed his achievement with evident pleasure—nay, with relish. He played with the ray pistol he had abstracted from the soldier's belt as the gifts were handed over. "Well," he asked, with his quizzical smile, "how does it strike you?"

"Speechless," I answered. "Are they all dead?"

"I hope not," he answered, "but if they are, their blood is on their own heads. Well, we're going back."

"What?" I exclaimed. "Back where we came from?"

"Certainly. Do you want to remain here and get caught? Hop in."

We climbed into the car, after we had provided ourselves with a holster and pistol apiece. Brown ordered me to don one of the protective garments, as he did; and rumaging under the seat he found head-protectors, like close-fitting helmets, which we saved for emergency.

Brown stepped on the lever, and the car darted back on the path it had come. As we sped back to Ultima the time master outlined his plan to me. Making sure the corselets were carefully concealed under our robes, he battered the inside of the car with the butt of his weapon, chipped the crystal, dented the outside; then he held out his robe and put a few holes through it where they would be immediately noticed. I followed suit, wondering at the audicity which had carried him alive from Atlantis, and which was now to lead him into conflict with men even million years ahead of him in the scale of evolution! It was like a man of the old stone age fighting a modern soldier; but then Brown was so far ahead of his own generation that he could not really be said to belong to any age.

As we dashed into the illuminated circle we had left a few hours before, Brown stood up, his hair disheveled, his aspect wild, and shouted again and again in the tongue of the last race. If ever I beheld astonishment on those impassive faces, this was the moment. "We are being attacked!" he oratorized, in his most effective manner. At least that is what he told me he said; I, for one, could not understand him.

"They killed our friends before our very eyes!" he continued. "They are bent on destroying you and keeping the planet for themselves! No longer do they need you! You are doomed! Even at this moment your lives are approaching their ends!"

With resignation on their faces, but without haste, and without apparent fear, the Ultimates made a concerted move for a building which stood apart. "That's what I wanted to know," whispered Brown. "That's where they keep their arms. I rather thought they would rush for them!"

With the basest ingratitude, the ancient warriors forgot us entirely—at least, they forgot to supply us with weapons. Perhaps they considered us incapable of using them. Strangely glittering side-arms dangled at the sides of venerable scientists; every man carried on his shoulder enough power to decimate an army. In an incredibly short space of time, the entire city had been surrounded with protective photoelectric devices arranged to explode mines of terrific power outside its gates. Detachments went below, down into the earth itself, to watch over the precious machinery that gave the underground world its breath of life. Others went up into the observatory, to defend to the last the noblest pursuit of mankind. But on every face was a look of utter resignation, as though this were the end, indeed; but on every face, also, I noted the stony determination to preserve the highest achievements and aspirations of the human race to the very last.

IN the general bustle and excitement Brown and I were unnoticed. We had failed in our destined function, and these men had no further use for us.

"I think I know where we left the time machine," said Brown. "If we can get there unobserved, it will be easier than I expected. After all, why should they want us to remain here?"

We moved in the direction indicated. Our way lay directly past the great elevators which connected the ground with the observatory. Unnoticed, we paused at our car to pick up the helmets we had found. As we repassed the elevators, one of the lightning-fast cars descended, and the chief of the council chamber stepped forth. He looked at us curiously. Suddenly he stepped forward and caught my hand in his, and looked deep into my eyes. I tried to struggle away from him, but it was too late. In that moment he had read what was in my mind; he saw, clear as day, the deceit and the trickery. With a dramatic movement he tore open my robe, and as the enemy pistol met his gaze, he raised his voice in command to his subordinates.

He started to speak; then he suddenly sank to the ground, a burning hole in his forehead. "Run for it," said Brown, holding his pistol. "He's told them we are enemies within their gates, in league with the enemies without; and the discovery of that enemy pistol spilled the beans. Put on your helmet, and follow me."

As we adjusted the protective metal and backed away, he said: "I could shoot up in an elevator and smash the dome of the ob-

servatory, and let in the cold to kill them all; but it'll probably kill us before we find the time machine, and I don't dare take the chance."

Something struck me in the chest—something that exploded and emitted poisonous fumes. "Lucky we have these armor plates!" said Brown, turning his ray gun on our pursuers.

Instead of falling, they continued to advance, slowly, methodically, knowing that we were trapped, and enjoying the cat-and-mouse situation. Their own protective corselets and helmets were more than sufficient to ward off the rays.

"Aim for their legs!" ordered Brown, firing over his shoulder as he turned and ran at full speed in the direction of a rosy glow.

I turned once to fire as he had ordered. The leader of the party wavered and fell on his face, struggling to rise; and then I, too, ran in the direction of the glow.

Explosive bullets scorched us through the projectors; a score of times my helmet withstood the impact of a projectile. At intervals Brown and I stopped for a fraction of a second to fire another round; but whenever we did, our erstwhile friends threw themselves flat on the ground, and presented nothing vulnerable. It became a game of tag, more grim than anything I had ever imagined.

Suddenly Brown screamed. A bullet better aimed than the rest, had glanced off his unprotected left arm, and the explosion, while it did not tear off the unfortunate member, disabled it at once. Still we ran, toward the strengthening glow, and Brown staggered and would have fallen had I not caught him. We held our arms before our bodies now, firing only at intervals. A bullet struck an inch behind my heel, and the flame burned like the fires of hell. Limping as I was, I had to support the almost unconscious Brown, more seriously wounded than I was.

Suddenly I realized why none of our shots took effect. The pistols had been discharged; the limited amount of energy was gone!

In a fit of fury I turned, ignored all danger, and hurled the weapon full at the oncoming Ultimates. The heavy pistol, flung with the desperation of insanity, thudded with a satisfying crunch against the kneecap of a leader; and if I am any sort of physician, it was a smashed knee that brought him crashing to the ground. And then, as we hurried forward, Brown and I received a crushing blow from before us, something that sent us reeling back!

"Quick!" he gasped. "We must have run into the time machine!" I pressed forward cautiously, found the door of the invisible mechanism, and shoved him through it, just as a bullet whistled over his head, struck the delicate controls, and demolished them with a blinding flash!

"Curse you!" I shouted, following Brown into the machine and shutting the door. My friend lay on the floor, a bloody sight, heaving convulsively. "Brown," I said, "can you still work the disintegrator?"

Something like a smile appeared on his face. I lifted off his helmet and replaced it with the helmet of the deadly atomic weapon. Then I seized one of my substantial automatics, opened the door, and fired. The heavy slug ploughed through the armor as through silk; it was a pleasure to see the honest lead crumple up a soldier who was aiming at the invisible time machine something I had not noticed before—a field piece which would have blown us, and the great crystal globe, to atoms!

Hitting the Mark!

MY automatic spurted flame and death among the last men of the world. Behind the eye-pieces of their helmets I could imagine their deep eyes wide with amazement at the efficiency of a forgotten weapon. As I reached for the other loaded gun, I heard a terrific roar, and the ground shook beneath us. Brown, laughing weakly, lay prone on the floor. And where a host of enemies had stood, was nothing but a gaping hole in the earth, and the reek of burning flesh; and, here and there, a fragment of a body, a piece of armor plate, a shred of clothing, a length of rifle!

"Better than I thought," gasped Brown with a chuckle, as he lapsed into uncon-

sciousness. "I could have—blown the whole—damn—nation—to hell!"

I slammed the door shut and pulled the unconscious Brown into a corner. For a few moments, at least, we were safe from further attack. I darted for the locker that contained the last set of controls. I knocked off the damaged mechanisms, cleaned the horizontal plates, set the new controls on them, and turned the lever. Nothing happened. Were we to be stranded forever here in time?

Looking round wildly, I glanced at Brown. He was too far gone to be revived in a moment. To my practised eye, his condition seemed to be serious. Then my mind flashed back to the time he had rebuked me. Had I seen a key? Was it not true that he had distrusted me to the extent of taking the key from the controls?

I felt around his neck. There was a chain; on the chain was a peculiar key. I jammed it into the lock on the control board, moved the lever, and listened. There was a faint vibration. The lights above me shed a flood of strengthening radiance. And then, looking down, I discovered I was naked! And Brown, lying on the floor, his left arm bleeding and swelling, the flesh charred and horrible to see, was as unclad as a satyr in the far-away, pagan days of classic myth.

As in ancient Atlantis, whatever we took with us disappeared as soon as we were in another time dimension. In that case we took with us things long since turned to dust, which vanished; and here we wore garments which had as yet no real existence! But I was more concerned with Brown; and after setting the control for our own century, I shut off the camera obscura, which had been left in operation—so as not to be distracted—and gave all my attention to the unconscious wizard.

Brown's arm was fractured at the elbow. I washed the wound with antiseptic solution from my medical kit, taped the broken skin, and improvised a splint for the burned and shattered bone. As far as I judged, the work consumed the better part of an hour. *Brown was still unconscious, probably from the terrific shock of an explosive bullet;* and I deemed it wisest to leave him in merciful oblivion. I prepared a hypodermic to deaden his pain when he came to himself. In order to keep up his strength I forced between his lips a little hot concentrated soup we had brought in vacuum bottles.

Then I cleaned myself up as well as I could, patched up my scorched heel, swallowed a few cups of the strengthening liquid, and rummaged in the inexhaustible locker for decent apparel. No matter where we came, we could never emerge in our embarrassing state, and Brown might die for lack of prompt hospital attention.

In the locker I found three pairs of ancient trousers, such as men love to go fishing in. Brown had his human side, after all. I slipped into one of the garments myself, pulled the other up over Brown's limbs, and felt once more like a human being. The locker yielded one flannel shirt, which I appropriated for myself. I judged it better for Brown to leave his injured arm free.

Then, and then only, did I flash on the camera obscura. But what I saw convinced me that we had still a long way to go, hundreds of thousands of years: and I inspected the controls, put my faith in Brown's machine, and stretched myself out on the floor for a little rest.

Presently I began to grow drowsy. The machine vibrated onward, through century after century, hurtling invisible through the fourth dimension to an age long past. Under the glowing roof lights I felt invigorated and refreshed, and basked in them as I would in a flood of sunshine. The sun! How long was it since I had seen the sun—the one I knew and loved, not the sickly, dying dwarf star of the Ultimates?

AND then the vibration died down and stopped. The machine, I sensed, gently came to rest. As in the time when I visited the dungeons of the French Revolution, I stood in another room; I stood invisible, but I grasped the controls, so as not to lose myself.

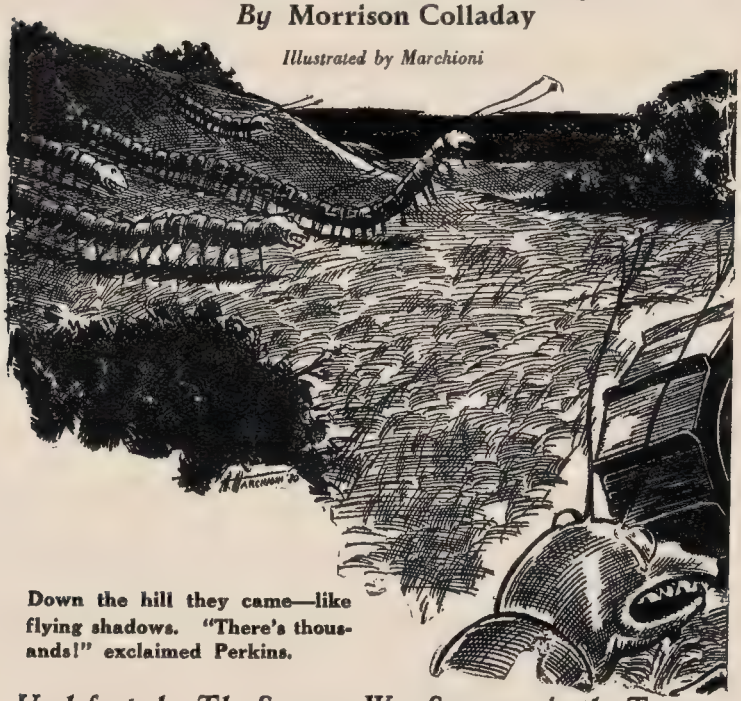
The room in which I stood, and in which lay the unconscious Brown, was vaguely

(Concluded on Page 750)

The Silent Scourge

By Morrison Colladay

Illustrated by Marchioni



Down the hill they came—like flying shadows. "There's thousands!" exclaimed Perkins.

Undefeated—The Scourge Was Supreme in the Town. An Army Was Held At Bay!

THE chief of police was having an unpleasant time. His face was flushed and he was frowning under the questioning of the Citizens' Committee. Benson, the chairman, was his most insistent tormenter.

"What do you expect us to do, Mr. Benson? We even borrowed men from the New York Department. If they can't find out anything, it proves that it ain't our fault, don't it?"

Benson shook his head. "We're tired of alibis, Hennessy. Ten or twelve men disappeared again last week. If you can't find out what's back of it all, we'll have to get someone who can."

While the chief paused to think up the most effective reply there was a knock at the door. "Come in," he growled.

A plainclothes man thrust his head into the room. "Say, Chief, there's a guy outside claims he just seen a man carried off by a big bug or something. I guess he's nuts, but I thought mebbe you'd want to see him. Says his name's Henry Todd."

"Lock him up," ordered Hennessy impatiently. "I got no time for nuts or drunks tonight."

"Wait a minute, Chief," interrupted Benson. "I know Todd. Better bring him in and let's hear what he has to say."

Hennessy looked his disgust. "Saw a man carried off by a big bug, did he? That's the craziest story yet. All right, Mr. Benson, anything to oblige. Bring the guy in, Dugan."

A minute later a white-faced little man evidently badly frightened, entered the room followed by a group of reporters.

"You can't come in here," growled the chief to the reporters. "We'll let you know later what we got to give out."

"Better let us stay, Chief," said one of them. "We've got this guy's story already and it's a wow!"

"I don't see any objection to the reporters being here," said Benson.

People are always disappearing and never being heard of again. Sometimes one of these disappearances gets in the newspapers, but usually not. A man grows tired of the monotony of life and wanders off to start a new and more exciting life elsewhere. Women disappear for much the same reason. Most of these cases are reported to the police who as a rule pay little attention to them. They are pigeonholed for reference in case a body is discovered floating in the river.

However, ten persons disappearing from a small town in one week was a different matter. South Orange is a fairly aristocratic suburb of New York and many of the inhabitants are well-known people. It is true that three of the missing were servants, but the other seven were the kind of persons who are regarded as important. One was a bank president, two were manufacturers and one a Wall Street broker. The remaining three were men who had retired from

business with comfortable incomes.

It seemed unlikely that these ten persons should drop out of sight voluntarily. Sinister rumors began to circulate. At first an effort was made to keep the matter from the newspapers. A private detective agency was called in and its operatives could be seen day and night gumshoeing through the Oranges. Then at the end of another week it was found that five of the private detectives had disappeared as well as several more of the residents of the town.

That Sunday the New York *Mirror* published a sensational account of the disappearances. It suggested that an organized blackmail and murder gang was at work in the vicinity of New York, and gave a list of the men who had dropped out of sight.

This first article blew off the lid. The other newspapers followed with sensational write-ups. Most of them dwelt on the blackmail - murder gang theory. The *Times* was the first to suggest that there might be something even more serious at the bottom of the mystery.

EVERY once in a while a sudden onslaught of animal or bacterial life reminds us that we go about our lives in the blithe feeling that the human race is supreme, and has no enemies worthy of itself.

The plague of influenza in 1918, the onslaughts of the corn-borer, the periodic ravages of the locust should all be evidence to us that powerful foes of man exist, and they need only a favorable circumstance to make us sadly aware of them. Each such plague or catastrophe finds us defenseless and totally unprepared. Perhaps our insect and animal foes realize it by this time; and they know that it needs only conditions more favorable than those of the past to entirely sweep men from the earth.

Mr. Colladay deals in an intensely realistic fashion with such a menace. He does not exaggerate it, yet he gives us the feeling that at any time the menace may widen its field and become a national calamity. A first rate story!

ALL the men had disappeared at night. Some of them had started from the railroad station to their homes and never arrived. One had left his house about nine o'clock to go a few blocks to a drug store. He never reached the store. Two had stepped out of their houses for a moment into the surrounding grounds. They did not return. The three servants had been sent on errands. The detectives who disappeared had been on night duty.

One difficulty about the kidnapping theory was that so far as was known, there had been no outcry or struggle in connection with any of the disappearances. It seemed hardly possible that a considerable number of men had been carried off against their wills without at least one of them putting up enough of a fight to attract attention.

Two or three servant girls were badly frightened by things they claimed to have seen. However, their stories were so fantastic that no attention was paid to them until Henry Todd told his experience.

Todd was bookkeeper for a New York commission house and had no more imagination than a cigar store Indian. He was married and had never taken a drink in his life. It happened that Benson was the only man at the police station that night who knew him personally. When he could not tell a coherent story because of fear and excitement, Benson took him in hand and quietly questioning him, brought out the facts.

Todd had been on the way from the railway station to his home in company with a neighbor James Lewis who commuted on the same train with him from New York. The streets of South Orange are bordered by estates of considerable size with the

houses set well back from the road. There are many places deeply shadowed by trees. Todd stopped for a moment to light his pipe and Lewis got a few feet ahead. Todd was sure there was no unusual sound, but something caused him to look up. He saw Lewis in the grasp of a monster which he had difficulty describing.

"It was dark there under the trees," he explained, "but it looked like a big worm with a hundred legs, like a caterpillar."

"What was it doing to Lewis?" asked Benson.

"It seemed to be holding him with its front legs. It was sort of standing up the way a caterpillar does, if you know what I mean."

"How big was it?"

Todd frowned in perplexity. "I know it couldn't have been as big as it looked there in the dark, Mr. Benson. I don't know what to say."

"Well, how big did it look to you?"

Todd considered the question for a moment. "It held Lewis up pretty near as high as the lower branches of the trees and there was a lot of it on the ground. I guess it was about thirty feet long. Its body was at least three feet thick through, besides the legs on each side."

MORRISON COLLADAY

"Did it see you?"

"I don't know. I was so surprised and everything happened so quick—"

"What happened? Did it start after you?"

Todd shook his head as he tried to remember. "I guess it didn't pay any attention to me. It went through the hedge of the Albertson place and I came running here."

"What about Lewis? Did he make any effort to get away?"

"He looked dead to me. He never moved or made a sound."

Hennessey had been regarding Todd with increasing disfavor. "Say, Mr. Benson, this guy's either drunk or crazy. You ain't going to swallow any fairy story like that, are you?"

Todd was still too frightened to be indignant. He looked helplessly from the chief to Benson. "I never took a drink in my life and I'm not crazy," he asserted with quiet dignity. "You know that, don't you Benson?"

"Yes, I know it," said Benson, "and I believe your story."

Benson was an important man in that meeting and represented even more important men. Hennessey became less truculent.

"If you know him personally, Mr. Benson, of course that's different."

"One of the Things!"

FIFTEEN minutes later a group of men started from police headquarters with Todd leading the way. All were armed with revolvers or automatics and two of them carried Thompson machine guns.

Presently Todd paused at a dark, tree-shadowed stretch of road. "This is where it happened."

Flashlights revealed nothing suspicious. "Where were you standing when you saw the worm?" asked Benson.

Todd walked over to a tree. "I stood right here so I could light my pipe. It's died down now, but there was quite a wind blowing."

"Now show us where the worm was."

Todd advanced gingerly to a spot near a hedge about twenty feet ahead. "It was right about here. Its head was waving around in the air when I saw it and it was holding Lewis with its front legs."

"Where did it go?"

Todd pointed to the grounds of a considerable estate. "It went through that hedge there."

"You didn't try to do nothing when you saw it carrying this guy away?" interrupted Hennessy.

"What could I do?" asked Todd sullenly. "I didn't even have a pen knife."

Hennessy examined the hedge. "There's a hole here all right," he acknowledged. "It's big enough for a cow to go through. Come along, you fellows."

"Hold on there a minute, Chief," said Benson.

"What's the matter?" demanded Hennessy. "Not getting cold feet, are you?"

"Don't you smell a strong animal odor around here?"

Hennessy sniffed. "Smells like a skunk," he said. "What about it?"

"It doesn't smell like a skunk to me," said Benson.

"It was strong enough to knock you down when I was here before," Todd volunteered.

"You noticed it then, did you?"

"It was when I was lighting my pipe. I got a whiff of it and I guess that's what made me look up to see where it was coming from."

"Mebbe the smell frightened you and made you run away," suggested Hennessy sarcastically.

Todd flushed. "I know it sounds rotten, but I think that smell had something to do with it. It made me sort of dizzy. I guess I lost my head."

"Lucky for you you did," said Benson. "You couldn't have done anything for Lewis and if you hadn't run away there'd have been two disappearances instead of one."

"You figuring the smell knocks 'em out?" asked Hennessy.

"Maybe. If it does, it explains why no one has put up a fight, doesn't it?"

Hennessy frowned in thought. "You understand, Mr. Benson, I ain't convinced by this guy's story that there's any such animals. I'm only following it up on your say-so."

At this moment there was a dramatic interruption. "What's that?" shouted one of the men, pointing down the road. "Look out! It's coming this way!"

"My God!" exclaimed Hennessy. "What is it?"

Afterwards the men were able to give a fairly good description of the creature by comparing their impressions. The road was dark except for the light of an occasional street lamp. The millepede — for that is what the naturalists eventually called it, in spite of its size—was running toward them with a man clasped in its forward legs. The front part of its body was therefore raised from the ground. The body itself was about three feet wide, but the legs added another three feet on each side. It looked about forty feet long and ran like the wind in spite of the weight it was carrying.

The men crowded to one side of the road, paralyzed with fear, until it passed. Then Benson grabbed a machine gun from a policeman. The stream of bullets caught the millipede where its body was elevated from the ground. It was not killed—in fact it was afterward found that it was impossible to kill them with bullets—but it was sufficiently hurt so that it dropped the body it was carrying.

The men, police and citizens alike, were so shaken by what they had seen that it was not until fifteen minutes later that some of them cautiously advanced to inspect the partly consumed body. "Is it your friend Lewis?" Benson asked Todd.

Todd shook his head. "No, it's not Lewis. He's bigger than that."

"How about the rest of you fellows? Any of you recognize it?" Some of them still hung back. "Don't waste any time," continued Benson impatiently. "It isn't pretty to look at, but there'll be worse things if we don't face this situation now."

CHAPTER II.

The Fight Begins

ANn hour later a white-faced, serious looking lot of men, representing the town's influential citizens were gathered in the chief's uncomfortably crowded office at police headquarters. Reporters from out of town were constantly arriving. The news of the night's discovery had reached the papers as a flash from one of the press associations. Benson had been tacitly accepted as the leader of the gathering. The police were intent on disclaiming responsibility for a fight on the giant insects.

Hennessy stated their position. "We couldn't do nothing even if we had the whole New York force here. If it was men, we'd get 'em for you, but these—these—"

Ben Finkel, president of the Central Bank, jumped up and shook his fist in Hennessy's face. "You're yellow rats? That's what's the matter with you. We'll kick you off the force—the whole bunch of you!"

"Well, you see it's this way, Mr. Finkel," explained Hennessy. "We all want to do anything we can, but we ain't much good in a case like this. It ain't a police case. What you need is a man like Mr. Benson here to take charge of things. Put him in charge and we'll all take his orders. We'll show you we ain't yellow."

There was a murmur of approval from the anxious-faced men. "Sounds as if it might be a good idea," admitted Finkel, "if Benson will take the job."

All eyes turned to Benson.

"Every man is subject to draft when an emergency as serious as this occurs," said Benson slowly. "However, you'll have to give me authority to take any steps I see fit and agree to carry out all orders without question."

"That's good enough for me," said Finkel. "How about the rest of you gentlemen?"

There were no dissenting voices.

"There's no use deceiving ourselves as to the seriousness of the situation," said Benson. "Something has occurred to produce this race of gigantic creatures that feed on human flesh. I imagine, because of the limited territory in which they have been operating, that at present there are not many of them. Our only hope is to find some way of exterminating them before they multiply. If we don't, they'll proceed to eat us at their leisure."

At this point one of the committeemen became violently ill.

"I know it isn't pleasant to think about," continued Benson, "but it's the condition we're up against. We haven't any time to waste."

"What are we going to do first," asked Finkel.

"We'll wait here until the rest of the reporters arrive and give them all the information we have. Everyone in South Orange who has a telephone must be notified to remain indoors until daylight. Tomorrow we'll have a meeting in New York of all the scientists we can gather together at such short notice."

The scientists met at Columbia University at three o'clock in the afternoon. Benson had given a general invitation through the newspapers to anyone who had any ideas he thought might be valuable. It was sure to bring some cranks, but it would not do in a case like this to ignore any suggestions. In addition Benson had telegraphed and telephoned certain biologists and engineers he wanted to be present without fail.

He addressed the gathering briefly. One of the newspapers had a stenographer present so there is an accurate report of the address extant. The salient points he made were two: First, that the giant millipedes were apparently a recent development from the smaller species with which we are familiar. Therefore the task for the biologists was to determine what new condition or what new food was responsible for their growth. As so far the millipedes apparently lived only in the vicinity of South Orange, the field for investigation was comparatively limited.

Second, that a method of destroying the giant creatures already in existence must be found by the chemists and engineers. Whatever the biologists eventually discovered as to their origin, it was necessary to devise immediately some way of destroying the monsters who were already in existence.

PROFESSOR Lucien Shepard of Columbia suggested that two committees of six members each be appointed by the chairman, one composed of biologists and one of engineers. This was done.

There were several developments during the afternoon. The governor of New Jersey declared martial law in South Orange and the adjoining communities. To make it effective he called out the state militia, which established a cordon around South

Orange. No one was allowed to enter the town and arrangements were immediately made to evacuate the inhabitants.

As it was impossible to carry out this latter order before dark, all persons were ordered for the second successive night to remain indoors. The ordinary millipede is a lover of darkness and apparently their giant brothers shared this characteristic, for none of them had so far appeared during the day. The soldiers on duty that night kept bright fires burning. None wandered far from his companions. In the flickering light from the fires, gigantic shadowy forms were seen flashing through the streets.

When morning came the evacuation of the inhabitants was begun, much against the will of some of them. At the same time the two committees appointed the previous afternoon got to work. Benson was ex-officio a member of both of them. In a joint meeting they decided that it was necessary to secure immediately one of the giant millipedes, alive or dead, no matter what the risk involved. The risk could hardly be overestimated. The ordinary millipede can run at a terrific speed, considering its size. If the larger ones possessed this ability in proportion, they could undoubtedly run rings around any living creature.

The biologists wanted to be definitely sure that the giant was a development from the smaller individuals instead of a new species. The chemists and engineers who had assumed the stupendous task of exterminating them wanted a specimen to study. Doubtless a reasonably safe way to kill or capture one could be devised in time, but time was the one thing the two committees did not have at their disposal.

Apart from the fact that until they were exterminated the millipedes would go on multiplying, their appetite for human flesh probably could not be satisfied by any other food. When South Orange was evacuated and it was no longer possible to capture human beings there, they would almost certainly extend their activities. The process of removing people from their homes could hardly be continued indefinitely.

Directed by the engineers, the soldiers started a foot by foot search of the country for the dens of the millipedes. They lived below the surface and any hole big enough for them to emerge from must be fairly conspicuous.

The afternoon's work yielded four suspicious looking tunnels. These were marked and plans were made to place at each of them an ingeniously constructed net strong enough to hold anything that became entangled in it. However, the events of the next forty-eight hours made this unnecessary.

The searchers left the evacuated area as it began to grow dark and the soldiers again took up their duties as guards. All residents had been removed from South Orange. As an added precaution, the fires that night were built only ten feet apart. A rampart of them extended entirely around the territory where the millipedes had manifested themselves.

All Unreasonable

THERE were a number of disappearances that night from such widely separated points as Caldwell and Elizabeth. When they were reported the next day Benson was inclined to doubt that the millipedes had any connection with most of them. It was natural to expect the millipedes to extend the range of their forays, but it was unlikely that they would make jumps of so many miles in twenty-four hours, presuming they all belonged to the one colony. It was a tempting opportunity for dissatisfied men and women to escape from their responsibilities and start a new life in some other part of the country. Undoubtedly a certain proportion of the disappearances could be accounted for in this way.

The really important news of the day, though no one realized it then, was an obscure item on an inside page of the *New York Times* telling of mysterious thefts at the plant of a certain chemical company. Benson's eyes lighted on the item and there rested thoughtfully. It was headed "Mysterious Thefts Continue."

> The Bauxite Products Company have been unable to discover the methods by which thieves night after night abstract large quantities of a certain

chemical which is being manufactured under contract for the United States government. Secret Service agents have been on guard for some time past, but the thefts continue. A puzzling feature of the case is the discovery of a number of curious tunnels in the vicinity of the plant which may have been used by the thieves.

Benson frowned and re-read the article. Then he called up the *Times* office and after considerable trouble got hold of a man able to give him the information he wanted.

"Where is the plant of this Bauxite Products Company?" he asked after explaining who he was.

"Back in the hills somewhere beyond West Orange."

"Funny place for a factory. Know what they're manufacturing for the government?"

"Search me. Whatever it is, they're keeping it under cover."

"I have a hunch I'd better find out," said Benson after a moment's thought.

"Think it might have something to do with the millipedes?" asked the newspaper man eagerly.

"Well, it occurred to me as a possibility."

"I tell you what I'd do if I were you, Mr. Benson. I'd get in touch with Washington. You're in South Orange now?"

"At police headquarters at the moment. Why?"

"We have a man there, Bill Gregory. If there's anything we can do at this end, let Bill know."

AN hour later Benson and three other men got out of a car before a series of low frame buildings surrounded by a high double barbed wire fence. Two guards were stationed inside a closed gate while others could be seen patrolling the grounds.

"What's the idea of keeping us waiting out here?" called Benson when the guards made no move to open the gate.

"Ain't no visitors allowed. You fellers get back in that car and get out of here."

"Send for the superintendent of the plant," demanded Benson.

"And who might you be?"

"Never mind who we are. You do as I told you."

The guard stared steadily at Benson for a minute. Then he turned to his companion. "Jim, go bring the chief here. Tell him there's four nuts outside. Tell him I want to know whether to shoot 'em or let 'em die natural."

Ten minutes later the second guard returned with a man whose face was dimly familiar to Benson. He frowned at the visitors. "Sorry, but no strangers are allowed within three miles of the plant. "Brady," he called to a uniformed man standing beside a motorcycle. "Go with these men as far as the road."

He started to turn away but paused at Benson's impatient demand. "My name's Benson. I haven't any time to fool with you or your regulations. If you give me any trouble I'll have the state militia take possession of your plant."

The face of the man inside the gate changed. "You the Benson in charge of this millipede campaign?"

"Yes," responded Benson curtly.

"I guess I can let you in. I don't know about the men with you. Who are they?"

"What's all the mystery about?"

The man flipped back the lapel of his coat, revealing a badge. "My name's Kelly. Government service."

"That's different," said Benson. "I'll vouch for these other men. This is Professor Sharpe of Columbia and Mr. Dowd, one of the chemists at the Edison plant. Also Bill Gregory of the *New York Times*."

"Afraid I can't let you bring a reporter in here, Mr. Benson."

"That's all right. I'll vouch for Mr. Gregory too. He won't print anything without your permission."

Kelly ushered the four visitors into the office of the plant. He gazed at them keenly. "What makes you think this place has anything to do with your giant millipedes?"

"We're investigating every possible lead," said Benson. "It was an item in this morning's paper about your plant being robbed of a certain chemical that sent us out here—that and the reference to your finding some mysterious tunnels."

"It's damn funny about those tunnels," said Kelly. "We come across new ones all the time and no one has a chance to dig

them. No man we don't know gets inside the fence."

"Yet somebody steals your stuff every night, if this newspaper story is right."

"That's the damnable part of it," said Kelly, flushing angrily. "It's true."

"This chemical that's being stolen — what's it used for?"

"I can't tell you that. It's a government secret."

Benson looked thoughtful. "Give us some idea. You needn't violate orders. The situation down at South Orange is so serious that we can't waste any time on a wild goose chase."

"What do you want to know?" asked Kelly.

"I'll explain. The biologists believe that the giant millipedes are small ones which have got hold of some substance which immensely stimulates their growth."

"It doesn't sound reasonable to me," said Kelly.

"IT doesn't sound reasonable to anybody. The whole affair's unreasonable. We don't know that there is any such substance. If the giant millipedes are a new species coming from underground to attack human beings, I don't believe there's much we can do. On the other hand, if they are just ordinary millipedes grown to gigantic size because of some substance they've got hold of, all we have to do is to find out what the substance is and remove it beyond their reach."

"Well, I'll take a chance on telling you this much," said Kelly. "We're manufacturing here an ingredient of a new poison gas for use in war. It's at least five times as destructive as any hitherto discovered." He smiled grimly. "It's a great peace preserver as long as we can keep its composition a secret from other nations."

The four men stared at him. "It's this ingredient that's being stolen?" asked Benson.

Kelly nodded. "That's why most of the Secret Service is working on the case now. We've got to keep the stuff from getting into the hands of any person who might analyze it." He paused. "I guess that's about all I can tell you."

"Mind if I ask a few questions?" said Benson.

"Ask ahead, but I don't know that I'll answer them."

"What relation does this material which is disappearing bear to the final product, the gas itself?"

"I can tell you this much," said Kelly. "Bauxite is used here to produce a material which is added to a certain other material. This second material is manufactured at another plant. They are mixed under pressure at still a third plant. When this pressure is released, the combined substances vaporize into the gas."

"I see," said Benson. "The two materials are manufactured and kept separate until they are needed."

"Exactly. They are both stable except when combined."

CHAPTER III.

The Experiment Works!

LATE that afternoon a dozen men gathered around a cage constructed of fine wire netting in one of the buildings of the West Orange Edison plant. On the wooden floor of the cage two ordinary millipedes about an inch long were darting around, trying to find a way out.

Benson carefully opened a lead-lined box which was filled with a sort of pinkish clay. The other men crowded closer to look at it.

"You say this stuff is extracted from bauxite?" said one of them, reaching over to pick up a fragment.

Benson seized his hand. "This was furnished by the government under the express agreement that no effort will be made to analyze it, and that whatever portion of it is not used in this experiment will be returned."

"Don't be so damned suspicious, Benson. I'm not a spy and neither is anyone else here."

"No, I suppose not, but the stuff's too important to take any chances with it."

"You're going to put some of it in the

cage with the millipedes," said one of the younger men present. "Suppose it has the effect you anticipate? That wire cage won't be much protection."

"That's all been prepared for. Even if this stuff makes little millipedes into big ones, it can't work instantaneously. We can fill this room with cyanogen gas in five minutes. That will take care of millipedes, big or little."

He carefuly opened a little door in the top of the cage and dropped some fragments of the pinkish substance to the floor. The two millipedes darted toward it and rolled in it with a kind of frenzy. "Like a cat with catnip," said Dowd, "only more so."

Benson looked at his watch. "It's now four o'clock. We have a great deal to do and I suggest we meet here at eight tomorrow morning to observe results, if there are any."

"You think it's safe to leave the millipedes?" asked Dowd.

"One of the laboratory men will be on duty here all night. We'll all sleep a few blocks away so we can easily reach here if it should be necessary."

Benson did not get to bed until midnight and he was very tired. He had a disturbed dream of an earthquake which was shaking down all the buildings in the city. Trying to escape a wall which was toppling on his head, he wakened to realize the noise was someone pounding on his door.

He jumped out of bed and found a white-faced bellboy standing in the hall. "They want you over at the laboratory right away, Mr. Benson. Something's happened."

"Come in and tell me," said Benson sharply, dragging on his clothes.

"They didn't say much over the phone, except to tell you to come down as soon as you could."

"That's all you know?"

"Well, I know what the men say that left the plant when it happened."

"Damn it, boy, when what happened?"

"The centipedes got loose and et up a couple men."

"God God! Go wake up Professor Sharp and Mr. Dowd and tell them what you've just told me, and say I'll meet them at the laboratory."

THE lobby of the hotel was filled with men, most of whom were trying to get out of the windows. The clerk hurried up when he saw Benson. "Better be careful, sir. The things they've been having in South Orange are here and they say they're eating people up!"

Benson hurried outside. He glanced nervously into the shadows and walked in the middle of the deserted street. He knew this was a useless precaution because of the millipedes' speed, but it made him feel safer. He had been carrying a gun for several days past but he was not now depending on it for protection. He carried in his right hand a large flashlight.

He thought he saw something slinking along in the darkness and pressed the button of light. The beam revealed a giant millipede fifty feet away. It was standing with the forward part of its body elevated, holding some object as Benson had seen one hold a human body a few nights before. When the dazzling beam of light fell on the creature it darted to one side and as the beam followed, slithered off the road.

Benson had had an idea that the millipedes were afraid of light, but he had not cared to take the responsibility of asking someone else to experiment. He swung the beam around as he walked rapidly toward the laboratory. Suddenly he realized the danger Professor Sharp and Dowd would run with millipedes in the street and no way of frightening them off. He turned and hurried back toward the hotel.

Sharp and Dowd were just coming out of the door when he arrived. "What's the trouble?" shouted Dowd.

"I don't know yet."

"Haven't you been to the laboratory?"

"I started, but I thought I'd better come back for you two." He related his encounter with the millipede and the effect of the light beam. Sharpe and Dowd went back for two flashlights and then the three hurried off to the laboratory.

The plant worked twenty-four hours a

day and all the windows were brilliantly lighted when they arrived. The laboratory looked as if a cyclone had struck it. There was no trace of the wire cage in which the millipedes had been confined. The furniture was demolished and the partitions torn down, and the floor was covered with fragments of bottles and retorts. A trail of red zigzagged across the floor.

"Looks bad," said Sharpe. "Wonder if the men all ran away? There isn't a sign of anyone here."

"Someone must be around," replied Benson. "They phoned for us to come down you know."

"Let's try the office. That's probably where they telephoned from."

The offices were on the second floor of a building a block away. As they tramped up the stairs the door at the top was cautiously opened and a man stuck his head out.

"Hurry!" he said nervously. "We saw you coming across the yard."

"What did you do, shut down the works?" asked Benson.

"The works shut themselves down when your millipedes got out."

Inside the room were gathered six white-faced men, and among them was the one who had been left on guard at the laboratory. "Hello, Roberts, I thought they'd got you," said Benson. He frowned. "Why didn't you turn on the cyanogen gas when things began to look dangerous?"

"They didn't look dangerous to me," replied Roberts. "The millipedes rolled around in the pink stuff and got bigger, but I thought there wasn't enough of it so they'd grow much."

Roberts paused uncertainly. "What happened?" demanded Benson impatiently.

"I suppose it's all my fault, but I thought I was doing the right thing. I don't know now what actually happened."

"You were there, weren't you?"

"I was over here at the office, telephoning for you. I thought you'd better come down when I found the experiment was working."

"What was the matter with the telephone in the laboratory?"

"There's no switchboard operator at night. The office is the only place to get an outside wire."

"I didn't get any message until after the millipedes had broken loose."

"I know, they said at the hotel you were asleep and they wouldn't call you. Before I got back to the laboratory the millipedes broke out of the cage and smashed things up."

"Did you see them?" asked Benson.

Roberts shook his head. "They were gone before I got back, but Wilson here saw them."

Fruitless Efforts

WILSON was a young workman in jumper and overalls. He was still white and shaken from the experience.

"How big were they?" asked Benson.

"The biggest things I ever saw, Mr. Benson. Forty or fifty feet long and as wide as this room. They were brown and had about a million legs."

Benson nodded. "That's what I thought. They weren't the two millipedes from the cage."

"Of course not. Wilson may be exaggerating the size of the creatures he saw, but still they must have been a lot bigger than any millipede could grow in a few hours, even with an unlimited supply of this magic food. These, you remember, had only a few fragments of the bauxite derivative."

Roberts looked relieved. "I'm sure glad to hear you say that, Mr. Benson. The other fellows are thinking I'm responsible for the deaths of the two poor boys that were carried off."

"Well, you aren't, so don't worry about it. The millipedes that did the damage came in from outside. They were after that pinkish stuff I left in the cage. I don't know how they found out it was in the cage, of course. Maybe they can smell it from a distance. They entered the laboratory and destroyed the cage to get at it. The little millipedes escaped. The big ones carried off a couple of the men. That's what happened, as far as I can reconstruct it."

"Then the experiment's been a success," said Dowd. "We've found out how to keep any more giant millipedes from growing up."

"It looks like it. All we have to do is get rid of the stuff that produces them. That's simple enough, now we know what it is."

"We'll get rid of all the bauxite product, this X-material," said Sharpe. "Then we'll go after the monsters already in existence."

The next day the Federal government acted. The machinery at the factory back in the hills was dismantled. All of the "X" material on hand was sealed in leaden cases and shipped to an arsenal in the Middle West.

Benson directed the operation and it was not until late afternoon, when the soldiers began arriving in trucks, that he learned the Federal authorities had also taken control of the evacuated towns.

He immediately realized the danger of having these additional men in the danger zone with the millipedes becoming ravenous for food. He got in touch with the governor at Trenton and later with the War Department at Washington. He was not able to impress the authorities with the seriousness of the danger to which they were exposing the troops. The soldiers had been specially armed with rifles, grenades and gas bombs. It was the confidence of the army authorities in the effectiveness of these weapons against the millipedes that resulted in the tragedy of that night.

IN a final effort to reduce the risk to the troops, Benson approached Colonel Zemurry, the commanding officer. "We've tried to have the War Department withdraw the troops from the danger zone, Colonel," he said, "but evidently some of your men will have to be killed before the Department condescends to accept advice."

Colonel Zemurry frowned slightly. He had the professional soldier's disdain for civilians, but because of Benson's position he made an effort to be courteous. "It seemed best to concentrate on exterminating the millipedes when they emerge tonight. There are enough troops to police the infested area and by tomorrow morning we should have it pretty well cleaned up."

"By tomorrow morning, if you carry out your present plans, you will have fed a lot of your soldiers to the millipedes and have made our job that much harder."

"I'll have to obey orders, Mr. Benson," said the Colonel shortly. "Besides, you've been using the state militia yourselves, haven't you?"

"We've used the militia to establish a cordon around the infested district, with fires every few feet to keep the millipedes from getting out."

"What's your objection to the plan of patrolling all the streets and roads in the district with soldiers armed with grenades and gas bombs? They'll kill all the millipedes they can and follow the rest to locate their lairs."

Benson smiled grimly. "It's evident you haven't seen any of the millipedes. They run so fast that hitting them with anything will be an accident. Besides, a pistol or a rifle bullet won't hurt them. I don't believe a machine gun will do one of them much harm, unless he's obliging enough to stand still and let you cut him to pieces. Remember, Colonel, they're thirty feet long and seven or eight feet wide. Wait till you see one."

Colonel Zemurry rose, terminating the interview. "I'm afraid, Mr. Benson, the troops will have to carry out the plan that has been arranged. I don't feel that I have authority to change it."

"Then at least, Colonel, have every soldier carry a powerful flashlight. The millipedes don't like light."

The Colonel frowned again. "How are we going to dispose of them if we frighten them away? We want them to come out of their dens and we'll be able to take care of them."

"Very well," said Benson, "I've done all I can. I've told the governor of the state and the War Department at Washington exactly what I've told you. There won't be any question tomorrow as to where the responsibility lies for what's going to happen tonight."

CHAPTER IV.

A Night of Terror

THE state militia, which had been on duty for several nights, had no illusions as to the kind of enemy they were up against. Consequently when Benson asked for co-operation from Colonel Moultrie, the commanding officer, he got it.

All the portable searchlights that could be secured were stationed at strategic points. Magnesium flares and rockets were got ready. The commanding officer of the federal troops tolerantly agreed that the militia should still maintain its guard around the south, north and east sides of South Orange while the federal troops would occupy the town itself and the territory to the west as far as the plant of the Bauxite Products Company.

Much of this territory was mountainous and wild. Exactly what arrangements were made for the soldiers detailed in this section to maintain communication with one another has never been made known. Events proved that the entire plan of operations was a mistaken one.

As soon as it grew dark Benson went to the militia headquarters which had been established in a large private house on the border of South and West Orange. It was built on the top of a mountain and had excellent automobile roads leading from it in all directions. Field telephone stations had been established on the picket line around South Orange. A switchboard in the entrance hall enabled Colonel Moultrie to keep in touch with every sector of the line.

Benson found the officers seriously worried. "There won't be any way of finding out what's happening out there in the mountains," said Colonel Moultrie.

Benson shrugged his shoulders. "What could you do anyhow?"

"Nothing. That's the damnable part of it."

He strode out on the terrace followed by Benson. To the south was the glow of the fires lighted by the militia. To the west there was nothing except an occasional flash and rumble.

"Damn fools to use artillery fighting bugs," grumbled Colonel Moultrie.

It was ten-thirty when the first report of trouble came in. The telephone stations had been reporting "all quiet" every fifteen minutes. "Colonel," called the operator, "station eleven reports that they can see the millipedes among the trees and there's hundreds of them!"

"Tell them to build up their fires and have the flares ready. Notify all the other stations."

Five minutes later reports came in of frantic regulars making efforts to reach the militia picket line. The searchlights revealed the millipedes in immense numbers darting around outside the line of fires.

Soon the fugitive soldiers stopped coming. "Some of them are safe in buildings," said Benson, "but I'm afraid for the rest."

For the next hour there was silence except for routine reports. Finally Colonel Moultrie turned to Benson. "I guess it's all over by this time."

Benson had been impatiently pacing up and down the terrace. "It seems as if we ought to be doing something," he said.

Colonel Moultrie frowned in thought as he gazed down over the dark and silent country which the federal soldiers had occupied. Then he turned to the man at the switchboard. "Order the tank corps to be ready in ten minutes. We'll go in and see what the situation is."

"When did the tanks arrive?" asked Benson in surprise.

"Several hours ago. You made more impression on the governor than you realized this afternoon. He couldn't do anything with the War Department but he ordered the six tanks the state owns over here. They're small and intended for mobs but they'll just suit us. They have two searchlights apiece and machine guns. They'll make about twenty-five miles an hour over rough country.

THE six tanks, two abreast, with searchlights playing ahead, made a formidable appearance as they roared down the road leading to the center of the silent town. Benson was stationed at an observation slot

in one of the forward two. The searchlights revealed no sign of life in the streets or the deserted buildings until the railroad station came into view. Here the tanks slowed down and stopped.

The first man out shouted "Gas!" Adjusting masks distracted the attention of the men for a moment from the scene of horror revealed by the massed searchlights directed across the tracks and centered on the red brick station.

The ground around the building, including the railroad tracks, was covered with a loathsome mass of dead millipedes. Scattered among them were the bodies of men in grotesque positions. Many of them had been partly consumed by the millipedes.

To see better Benson slipped off his mask for a second but had to replace it, choking with the gas which still filled the depression of the railroad tracks and overflowed the road.

The legs of the millipedes twitched as the battery of searchlights was turned on the mass of liquefying flesh. Colonel Moultrie motioned toward the machine guns mounted in the tanks. Benson shook his head.

He started to pick his way toward the nearest human body which happened to be unmutilated. It was lying face downward and he rolled it over. As a matter of form he put his hand inside the shirt, though the body was already stiffening. Then he got up and spread his hands toward the watching men to indicate the futility of trying to render any assistance.

Colonel Moultrie ordered the men back into the tanks which started slowly forward while he and Benson removed their masks and consulted as to the next thing to do. The faces of both were set in grim lines.

"I counted ninety-seven bodies," said Benson. "There's no telling how many more are in the station or covered by the bodies of the millipedes."

"Or eaten by them," interjected the Colonel.

Benson nodded somberly. "I can't under stand what happened at the station. I never dreamed of their having a set battle with them."

"It looks to me," said Colonel Moultrie, "as if the regulars finally realized what they were up against and gathered in the station to defend themselves. Here they were attacked in the one-story building by an overwhelming force of the millipedes."

Benson nodded. "Ravenous, because their food supply had been cut off. Guns and grenades weren't any good against them, and gas not much better."

"The gas did kill the millipedes," said the Colonel. "The trouble was it didn't kill them quickly enough to save the men."

There was a sudden exclamation from the lookout at one of the observation ports. The tanks were approaching a large brick building which stood back from the road.

"Looks like a schoolhouse," said Benson.

"And there's a light in the upper story," added Colonel Moultrie. "Somebody alive there?"

"Look at them things running along the ground," said the lookout. "They was running all over the walls a minute ago."

Colonel Moultrie gave a grunt of disgust. It was his first glimpse of live millipedes. The ground was covered with them, a squirming mass of hideous legs and more hideous bodies. The searchlights made them uncomfortable and they tried to dart away, but there were too many of them. They got in one another's way. After a few seconds' effort to escape the glare of the searchlights they turned and made a frenzied rush toward the tanks.

Benson remembered the paralyzing odor the creatures emitted. The men had followed the Colonel's example in taking off their gas masks.

"Put on your masks," he warned. He leaped for one of the observation ports and shouted the same warning in the hope that the men in the other tanks would hear.

The Survivors Gather

HE felt a searing pain and the blood poured from a jagged wound in his cheek. As he fell backward he saw two of the men slashing at half a dozen legs which were reaching through the port. One of the legs fell inside the tank, severed by a sharp jack-knife. It was three feet long and armed

with sharp claws. It wriggled and jumped around on the floor of the tank while the men beat at it with their rifles. There came a yell of pain from the other side of the tank. A man had had his face badly slashed by legs inserted through another port.

All openings were hurriedly closed and Colonel Moultrie, who was a physician in civil life, started to work on the two wounded men. Benson had a nasty cut across one cheek but it was nothing to worry about unless the millipedes' claws should prove to be poisonous. Colonel Moultrie swabbed it with iodine and fastened a dressing on it with adhesive tape. The other man's wound was more serious, for his eye was badly torn.

"I'll have to get him to a hospital as soon as I can," said the Colonel in a low voice to Benson.

Benson shook his head. "Can't be done. Whoever tries to drive will be torn to pieces. He'll have to see where he's going and yet you daren't uncover an opening."

Colonel Moultrie frowned. "You think we can't make it?"

"If you try you'll have a lot of us to take to the hospital."

"Well, I suppose we can stay here until morning if we have to."

"Yes, that's one thing to do," agreed Benson. "The millipedes will leave at daybreak. I have a better idea though. You've got a couple of tanks of gas. Why not use it? It killed them back there at the station."

"We might try it," said Colonel Moultrie, "though it's going to be hard for you to wear a mask on that face of yours and harder still for this boy here."

"We'll manage somehow," said Benson. The wounded man nodded and swore softly under his breath.

The men in the tanks sat silently, masks on, listening to the hiss of the gas as it escaped from its cylinders. Benson kept his eyes fixed on his wrist watch. At the end of thirty minutes he carefully opened one of the observation ports and jumped aside.

Nothing happened. He advanced cautiously to the port again and gazed out. The searchlights of all the tanks were still directed toward the schoolhouse. For a moment Benson did not notice the piles of dead millipedes. Curiously enough, there was never very much left of them after they were dead, except the legs. The bodies quickly disintegrated. Now as he looked downward the ground as far as he could see was covered with them, their legs still feebly waving.

Benson glanced around at the men in the tank. They all looked half asleep. "The millipede odor," he muttered to himself. "Didn't get their gas masks on soon enough. I'll wake them up." He had been in one of the first tank corps organized during the war and he had not forgotten how to drive. He climbed to the seat and threw in the clutch.

The tank slowly straddled the ditch beside the road and crushed down the stone wall which surrounded the school grounds. It crawled over the millipede bodies which covered the campus and brought up against the steps leading to the building.

BENSON scrambled down and was the first man outside. He was relieved to see the other five tanks crawling across the campus. That meant there was probably not much wrong inside them. A few minutes later their crews, still a little groggy, poured out. There were a few cut faces and arms but no serious casualties. Colonel Moultrie made a hasty inspection and nodded his head in satisfaction.

Meanwhile the great double doors of the school remained closed, though the upper floor was still lighted. When pounding on them brought no response a machine gun easily smashed the lock. The tank crews made a concerted rush up the stairs to the third floor. Here they found twenty-five badly frightened soldiers.

"Why didn't you come down when you saw us?" demanded Colonel Moultrie.

A sergeant who was the only officer in the party explained. "Gas. We haven't any masks."

"What did you do with them?"

The sergeant shrugged his shoulders. We couldn't run fast enough with 'em on."

"Did the millipedes get any of you?"

"Plenty."

"Well, I guess you'll have to stay here until morning. Any more of you in the buildings around here?"

"Some, I guess. It was every man for himself when them things got after us. We don't know how many got away."

MORNING revealed about two hundred survivors from the two regiments, barricaded in buildings. Searching parties during the day picked up the bodies of the dead wherever they could be found. The extent of the tragedy was not known in time for the morning papers, but the evening papers gave it flaming headlines. Benson's futile protest against the massing of troops in the area was revealed by the governor at Trenton and condemnation of the War Department for the needless slaughter of regular was violently expressed in Congress.

There was a spontaneous demand from a number of quarters simultaneously that the federal troops be placed under Benson's control and that he be given officially dictatorial powers. This was accomplished a few hours after the demand was made, by the President's declaring martial law in northern New Jersey and appointing Benson military governor. There was no precedent for this action, but there was no precedent for the appalling situation which existed.

Benson immediately ordered a concentration at South Orange of all the tanks in the eastern part of the country. In view of the destructive effect of gas on the millipedes, this seemed the best way to fight them. Presumably with the removal of the X-substance no new millipedes were being produced. If those already in existence continued to attack as they had at the railroad station and at the schoolhouse, they could be exterminated in a short time.

No attempt to attack the millipedes was made the night after the massacre. The militia kept its fire-studded picket line around the town. In the meantime the tanks were gathering, each supplied with cylinders of compressed gas.

CHAPTER V.

A Nation Aroused

THE following night the advance into the infested territory began. In long orderly rows were over a hundred tanks, large and small. At a rocket signal they started into life, roaring, clanking iron monsters with searchlights playing in all directions, inviting an attack by the millipedes.

They traversed the territory where the millipedes had been seen and returned to their starting point without getting more than a distant glimpse of shadowy giant forms which sped away before they could be attacked.

Morning came with nothing accomplished. This procedure was followed for three more nights with the same results, before Benson acknowledged that it was a failure. Why the millipedes attacked the first night and ran away afterward was and remained a mystery.

It was evident, however, that some new way of attacking them must be found. They were beginning to appear in the surrounding country and again people were being carried off. Their numbers had been greatly reduced and they were perhaps less aggressive, but their appetite for human flesh had not been curbed.

It was a suggestion in a letter written to the New York Times by a man whose identity was never discovered that indirectly ended the menace. The letter read:

> Editor *New York Times*: Sir: If these so-called scientists ain't absolute fools why don't they use a little Horse Sense. I am a Vermin Exterminator and I could kill all the Millipedes in twenty-four hours. They ain't got sense enough to hire me to do it so I'll tell them how for nothing. Here it is. Get some of that X-stuff and put it where the Millipedes will find it. When they come after it shoot the gas into them. Everything's easy if you know how.

The letter was signed "Bug Killer." It immediately attracted country-wide attention. Strong pressure was brought to bear on the government to try the suggested plan, without success. Spokesmen for the War Department announced that the risk was too great. Exposing enough of the X-substance

to serve as bait would, if there were any defect in the plans, be the means of creating another generation of the giant millipedes. There would be a new crop added to the survivors of the old lot.

It was while matters were at this impasse, with public opinion becoming more bitter as the newspapers told day after day of new victims of the millipedes, that the idea occurred to Benson which brought the war to a close.

He embodied it in a memorandum to the War Department. Briefly it was to use the secret XY gas in an effort to exterminate the remaining millipedes. He suggested that it was at least possible that the X-substance retained its attraction for the creature even after it had entered into its XY combination. If this were the case, it would only be necessary to release a quantity of the gas in some isolated place. The millipedes would be attracted by the X-ingredient in the gas and would be destroyed.

Benson was summoned to Washington where he met the head of the Chemical Warfare Division.

"Your idea is plausible enough," said General M., "but unfortunately it is impractical."

"Impractical?" repeated Benson. "Why?"

"For several reasons. One is that we do not know how long the gas will make the place where it is released uninhabitable. You see, it is too dangerous to experiment with and we know very little about it. It has been manufactured as a threat to potential enemies with no real idea that it will ever become necessary to use it."

"I SUPPOSE you saw in this morning's paper that several more children had been carried off," said Benson. "It seems the millipedes have acquired a taste for children."

"Yes, it's horribly distressing."

"Is it so distressing that you'll take a chance on making some place uninhabitable for awhile?"

"There's still another difficulty, Mr. Benson. We don't know whether any of our gas masks are effective against this gas. The men who attempted the experiment you suggest would practically be committing suicide."

"You supply the gas," said Benson, "and I'll get enough volunteers to use it."

Several nights later, Benson with two companions entered an especially prepared tank. As soon as it was known that an effort to destroy the millipedes was to be made which would be particularly dangerous to those taking part in it, there were hundreds of volunteers. Benson's task was simply to select those he wanted to take. His choice fell on a man named Williams who had been in the Tank Corps during the war, and Perkins, a gas expert of the Chemical Warfare division.

The tank was hermetically sealed and all observation ports were covered with thick, non-shatterable glass. Instead of gas masks each man was supplied with a helmet very much like a deep sea diver's to which was attached a cylinder of compressed oxygen. These were for use if for any reason it became necessary to leave the tank after discharging the gas.

Cylinders of the deadly XY gas had been rushed by airplane from an arsenal in the Middle West.*

The tank with the volunteers proceeded slowly through the darkness to an uninhabited valley in the hills beyond South Orange. No searchlights were used because the object was to attract the millipedes instead of driving them away.

When it reached this agreed on spot the three men shook hands with one another. Benson and Perkins opened simultaneously the two petcocks which released a stream of gas from each side of the tank. Then they stationed themselves at the observation ports and watched. If the gas still possessed the attraction of the X-substance the millipedes would be drawn to their destruction. If it did not—there would be another failure to add to the increasingly long list since the war with the millipedes started.

Benson's gaze was fixed on the distance

*Any detailed description of the special apparatus devised for discharging the gas with a minimum of risk to the men in the tank is prohibited. In fact it has been requested that this final episode in the war with the millipedes be described as briefly and with as little detail as possible.

where he expected the millipedes to appear and it was a minute or two before he became conscious of a curious glow around the tank. It was rather like the red fire of a torchlight parade, except that it was more evenly diffused.

"Damned funny," exclaimed Perkins.

"Must be the gas," said Benson. "It's evidently luminous in the dark."

Now they could see it spreading from the nozzles through which it was being discharged into the air. Gradually the entire valley became alight with its rosy glow.

"I guess we're going to see the whole show," said Perkins.

"If there's any show to see," doubted Benson. "So far I don't see any signs of millipedes."

"There's one now!"

A great shadowy creature like a mediaeval dragon came sweeping down the side of the hill. In a second it was beside the tank with its head pressed against the glass of the port. All three men started back in sudden disgust and horror. It was impossible for a human being to look calmly at those protruding eyes and slobbering lips. The head was pressed against the glass for only a moment. The gas immediately got in its deadly work. The millipede sank back and the giant body turned over, leaving the legs feebly waving in the air.

"It works!" exclaimed Perkins.

"I guess it does," Benson agreed. "Here are some more of them."

DOWN the side of the hill and up the valley they could be seen coming like flying shadows. They bathed for a moment in the rosy glow and then sank helpless to the ground. "It's like dead leaves falling in a high wind," said Williams.

"God, there's thousands of them!" exclaimed Perkins a few minutes later. "They'll bury the tank!"

"Looks as if we might get them all this time."

Soon the bodies reached to the port and a little later covered it.

"How long are we going to stay here?" asked Williams.

Benson kept his eyes on his wrist watch as the minutes slowly passed. Finally he stooped down and turned off petcocks in the two cylinders. "We'll get out of this now, if we can," he said to Williams.

Slowly the caterpillar treads began to move and the tank started forward. Benson switched on a searchlight but it did not illumine the darkness as the tank crushed its way through a mountain of dead millipedes. It travelled a hundred yards before it reached the open air. Now the searchlight showed a concrete road ahead. Behind it revealed the entire valley a writhing mass of quivering bodies and waving legs.

"Think they're really dead?" asked Perkins doubtfully.

"Dead enough," said Benson. "The legs may keep that up for an hour."

* * * *

This was the final rout of the millipedes. For forty-eight hours no one visited the valley, to give the XY gas a chance to dissipate. On the morning of the third day a cautious advance was made by a group of men headed by Benson. They were ready to stop at the first indication of ill effects from any remaining gas. They found none.

The little company came to the valley of the massacre. Scarcely any trace of the mountain of dead millipedes was to be seen. The scavengers of the earth and air had done their work.

That afternoon the two committees of scientists sent out their first optimistic report. They stated that they believed all danger was over, that practically all of them had been destroyed and any remaining specimens would be exterminated as the result of measures to be put into immediate effect.

A careful exploration of the entire country which had been infested was begun. Wherever a hole or cave was found cyanogen gas was forced into it under pressure. Then the opening was filled up with concrete. Tanks and militia remained on guard at night for three months. At the end of that time the people of South Orange were allowed to return to their homes.

No authoritative announcement was ever made of the number of persons killed by the millipedes. The whole affair is so in-

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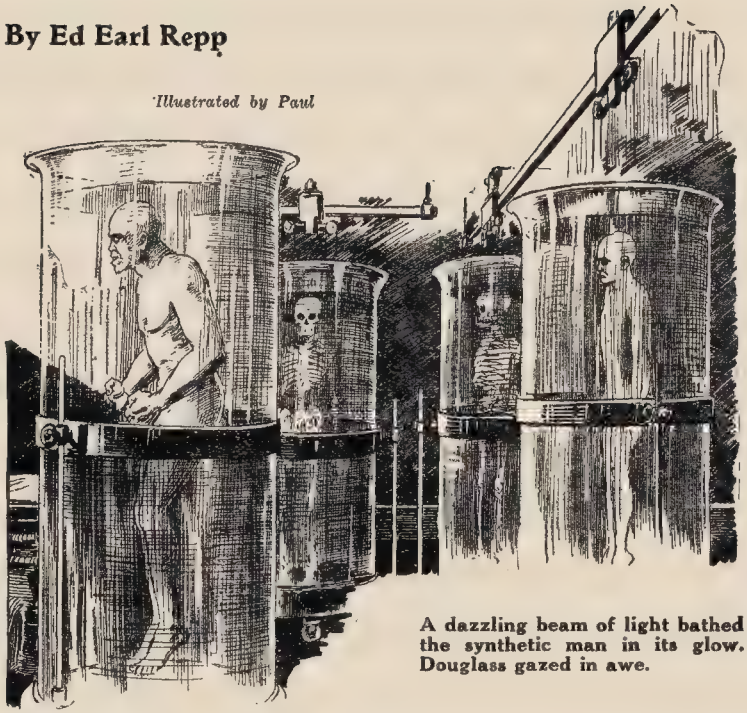
The Synthetic Men

By Ed Earl Repp

Illustrated by Paul



A dazzling beam of light bathed the synthetic man in its glow. Douglass gazed in awe.

For Generations They Labored to Create Man in His Image — But the Revolt Came!

GHOSTLY and weird was the laboratory in which Dr. Pontius labored from early morning until late at night on the delicate subject of life and all its intriguing mysteries. It would have been an excellent place for an exponent of black art or sorcery, and at this time the shadows of night had stolen into the room making it even more spectral. But the blackness was somewhat relieved by a single, frosted electric lamp that cast a pale, phosphorescent glow over a paper-littered desk in a dismal corner.

Hanging along the wall on the right was a row of four human skeletons, complete and erect. On a massive shelf over these stood rows of colored bottles, each bearing a label identifying its contents. The shelf ran the entire distance around the room except where a lone door created a four-foot gap. Directly opposite the grisly human relics, and flanking Pontius' desk, rested two monster test-tubes of thick glass, large enough to accommodate the body of a full-sized man.

Due to the murky gloom of the place, it would have been hard to determine, at a first glance, just what the tubes contained, because they were half-hidden in the enveloping shadows. But a close observer would have been appalled to behold that each tube contained the nude body of a man, seemingly at rest, in the thick-jelly-like fluid that the tube contained. And if one had turned on one of the green-looking globes that hung suspended above each tube he would have been amazed to see the man's body become transparent, so transparent and seemingly delicate that the internal organs could be seen functioning with the steady precision of a watch!

Through the arteries of the bodies he would see coursing a peculiar pea-green fluid, that seemed to glow like liquid emeralds. In one body it flowed in a steady stream, but in the other it was sluggish and thick, gushing through the veins in quick, spasmodic jerks with each throb of a green heart that was located far up on the right side.

It was easy to see that this latter creature was on the verge of death. But the first, his rather cruel, sharp features appearing peaceful and calm, seemed as normal as a man asleep on his feet. Both bodies erect, supported by the heavy-fluid, faced the laboratory in a way that Dr. Pontius could glance at either of them from his desk.

He was the son of the famous Edward Pontius, who in 1934 had startled the world with his discovery of the Q-Ray that he said was the wavelength of energy fundamental to the continuance of life. He had been besieged by the press, the government, and scientific societies to divulge his secret more fully, to tell from where this ray emanated and how it was produced. It was known that he had made some astounding experiments of the effect of Q-Rays on animals.

But Pontius refused to release his secret saying, "It is not ready for the world." And when he had passed on, his mantle was naturally worn by his son and scientific

heir, the present Clifford Pontius.

Close associates knew that young Clifford had been trained from earliest youth on the mysterious experiments of his father; and when old Edward had died, Clifford, then twenty-six, had hidden himself from the world to "carry on", as he called it. Now Clifford, at the age of seventy, was about to reap the fruits of sixty-five years of unremitting labor between father and son.

A LITTLE less crusty than his father, he believed that the time had now come for the world, which had meanwhile forgotten him, to learn the result of his discoveries. As he now sat at his desk, wearily slumped in his chair from an all-night siege at his complete report, he awaited the arrival of a reporter whom his old friend Amesbury, editor of the *Globe*, was sending for the story. Pontius had chosen the *Globe* as his medium for the release of the secret to the world, because he knew he could trust the way Amesbury would handle it. There would be no sensationalism—just a simple recounting of the fact that with the continual experimenting of sixty-five years, he had been able to produce two mature, living, thinking, synthetic men!

THERE is no greater secret that our scientists would like to learn than how life was formed. In that secret may well lie the clue to the entire nature of the universe. We can guess that at some remote age, something happened to a bit of lifeless material—thru some strange circumstances that we have never seen duplicated—that gave this material life. That something happened millions of years ago and the thing it gave life to became no more than a one-celled animal. We are its descendants, with our millions of cells, in specialized groups, complicated beyond belief.

What if a scientist by trial error, and experiment after experiment, should finally hit upon the secret and be able to make life synthetically—would it be a blessing or a curse? Mr. Repp has his own answer to this question in the present story of thrills and chills.

Pontius looked up from his desk quickly at the sound of a muffled bell. He pressed a button on his desk, and a picture flashed on a little screen in front of him—showing a young man on the doorstep, hat in hand.

"Who is it?" asked Pontius into a little tube near his face.

The young man looked around startled. "Why—why, I'm Douglass of the *Globe*, wherever you are," he answered.

Pontius pressed another button that controlled an automatic electric lock on the outer door and waited. Presently, he heard scraping feet in the hall outside the laboratory and went to the door.

"Come right in, Douglass," he invited, peering through thick, octagon-shaped glasses at the rather tall but effeminate - looking young man who stood in the hall-way. "I have been waiting for you."

"Thanks, Dr. Pontius," the reporter responded cheerily as he entered. "I'd have been on time but a traffic jam delayed me."

Dr. Pontius grunted and slid into his swivel chair at the desk. Douglas sat down near him and glanced around the room. He was lean with dreamy eyes, but despite his effeminate appearance he seemed well able to take care of himself. Yet at the sight of the grinning skeletons and the synthetic men he gave a perceptible start. The scientist eyed him with a contemplating glance.

"Don't like them, do you, young man?", he asked seriously.

Douglass shuddered. "I always feel strange in the presence of human skeletons, Dr. Pontius; and *these* things", he added pointing to one of the creatures.

"Quite natural," said the scientist. "Every living thing has some horror for skele-

tons of its kind. Even a dog will avoid its dead. But you don't feel that way about my children," he smiled nodding toward the figures in the test tubes.

"They don't appear to annoy or bother you," the reporter commented. "Where did you get them—the skeletons?"

Dr. Pontius settled back in his chair and filled his pipe with the same deliberate coolness that he performed the other act.

"The first one is all that remains of 'Killer' Garth who was executed at Sing Sing five months ago," Pontius remarked casually.

Douglass's eyes flashed and he squirmed uneasily in his chair as he regarded the designated skeleton. Pontius continued: "Number two was an unidentified laborer who was drowned six months ago at Camden, New Jersey. Note the curvature of the vertebrae at the neck—"

"No thanks, Dr. Pontius," said Douglass, turning his head. "I've had enough. But why all the skeletons?"

Pontius realized that Douglass was purposely avoiding the subject of the meeting—his two synthetic men. He snapped a tiny lighter into flame and ignited his pipe, contemplated the reporter silently for a moment and then blew out a cloud of smoke. With a nod he drew the young man's attention to the test tubes.

ED EARL REPP

"I am using them to obtain in the surrounding jelly a substance which I need for the making of my synthetic man." There, he had shot his bolt. He regarded Douglass' awe-struck face as he continued. "In other words, the skeletons will dissolve into my fluid until they are all gone. The fluid will be enriched by a substance necessary to the production of life."

Douglass almost jumped out of his chair when he comprehended what the two test tubes in the shadow contained. He stared at them for fully five minutes before it dawned upon him that the contents were really living men. His handsome face went strangely pale and took on a ghostly appearance under the glow of the feeble lamp that scarcely touched the gloom enshrouding the tubes. So this was the mysterious story Amesbury had sent him for!

But could it be true? He felt a shiver steal up his spine as he contemplated the grotesque creatures and turned quickly to see the scientist studying him intently.

"I DON'T envy your job," Douglass said in a half whisper. "But do you mean that you can make new men; living, thinking men out of that green jelly and bones?"

"Partly, yes," replied Pontius, sucking at his pipe. "The creation of life is no longer a mystery, at least to me, but the solution lies deeper than dead men's bones."

"Of course," commented Douglass with a strange sense of reality. "Still, I think, if I were you, I would be afraid of the wrath of the Super Intelligence that created all life at the beginning. Synthetic creation of human life by man, it seems to me, is a violation of all the laws of God."

Dr. Pontius shrugged. "The Super Intelligence is the mind, young man," he said bluntly. "All life originally evolved through the crystallization of a colloid. The idea that one creator made all things is a primitive superstition. At least that is my opinion and it is founded on two generations of research and experimentation in the realms of material physiology, by my father and myself."

"You are an atheist, then?" Douglass inquired, amazed.

Dr. Pontius' pipe had gone out. He scrutinized his guest with an amused look as he applied the lighter again.

"I'm afraid my views on religion would be uninteresting to you, Douglass," he said simply. "It is a delicate subject to discuss and not injure the feelings of another; so-

let us get down to the business of your visit."

Douglass' face brightened. He had discovered himself forming unkindly opinions of this old scientist for his seemingly dogmatic views. The idea that the Creator had made all things had been drilled into Douglass from childhood by devout parents and he resented anything to the contrary—despite his broad-mindedness. He was glad to change the subject, for he had no stomach for an argument with the scientist and, above all, he wanted the story.

The reporter nodded. "Then you can proceed, Dr. Pontius," he said, taking a sheaf of folded foolscap from his inner pocket in preparation to take notes. "You need not deviate from scientific parlance. I am well schooled in science and will understand your terms quite amply. Biology has always fascinated me. I am glad of this opportunity to hear an expert discuss it."

"That's fine," applauded Dr. Pontius with a mischievous grin. "I want you to get it right. Don't hesitate to interrupt if I get too deep for you."

CHAPTER II

The Story of Pontius

FOR two solid hours the scientist's voice droned out in the dismal room. It seemed smothered and stifled by the closeness of the place. The reporter's pencil literally flew over his papers. Dr. Pontius talked steadily, touching many details of his discoveries. But he talked about it abstractly. He did not seem eager to have the world know that he, of all men, had been the first to solve the mysteries of life.

If Douglass had thought himself well-schooled in science, he soon discovered that he was pitifully ignorant. Many times was he forced to interrupt the scientist for a simpler explanation of a detail. Dr. Pontius rallied to his aid on each occasion. Again and again he gestured toward the test tubes. Each time the reporter experienced chilling sensations running up and down his spinal column.

The story that Pontius told was, in effect, the history of two generations of unremitting devotion to an idea. Two men, father and son, following each other in the silence of this laboratory, watching over bits of microsopic material, that were finally to become men. Not perfect men. Pontius emphasized this fact to Douglass. And to illustrate it, he took the fascinated reporter in front of one of the bodies and switching on the globe suspended above, illuminated the internal structure of the creature. He showed Douglass that instead of having blood coursing through his veins, the creature had a green fluid that Pontius called, *Xyone.* And further, as a memento that the hand of the potter might occasionally shake, he showed that the synthetic man's heart was on the right side instead of the left. There were other differences, too, that set the synthetic man apart from our own flesh and blood, but these differences only served to Douglass to heighten the reality of this amazing creation. Leaving the creature who, seemed to be asleep in his enveloping green fluid, the two men returned to their seats and Pontius went on with his story.

The original discovery that the elder Pontius had made was the creating of a single-celled organism from agar, a derivative of sea weed, that had been treated at various temperatures and in various solutions. It was all part of a preconceived idea of Edward Pontius that under the proper conditions animal life could be produced from plants. That was where the Q-Ray came in.

Edward Pontius had experimented with the effect of cosmic rays on animal life, and found that they were fatal in large doses. So were the much longer radium rays and the still longer X and ultra-violet rays. But each of these in proper doses was beneficial to life. Here indeed was the beginning of a puzzle that the giant mind of the elder Pontius could unravel. Might not one of these short wavelength radiations be the one that coming from outer space had caused plant life to change miraculously into animal protoplasm.

The Q-Ray was the answer. Lying between the gamma rays from radium and the

cosmic ray,* they were found to be a narrow band of radiations unexplored by science. Perhaps they were unexplored because of the peculiar conditions necessary to their propagation. And further, because the conditions necessary to produce them were so delicate, their presence had not even been detected.

But Edward Pontius had discovered that on projecting the Q-Ray on the agar he produced a microscopic bit of living matter. And when the ray was intensified, the microscopic organism, in a miraculous way, began to subdivide and grow and become more complex. The process of the increasing complexity of simple organisms that took hundreds of thousands of years in nature took days in the laboratory of Edward Pontius.

Feverishly he set to work to yest this amazing fact to the fullest. After inadvertently telling the world about his Q-Ray he saw his mistake and retired to his laboratory for the rest of his life. Month after month, year after year—testing, retesting, discarding, starting over; he finally evolved a process that had finally culminated in the two synthetic men his son had produced.

What it meant was that the process of the evolution of a single-celled organism into a mature man, which had taken hundreds of millions of years had been compressed under the action of the Q-Ray into sixty-five years! Douglass gasped when the significance of these words penetrated his mind.

"Of course," Pontius said slowly, "when my father died and left me his experiments I knew I would succeed. All I had to do was to carry them on; and allow the half-formed creatures to continue evolving. But now they are finished, badly finished, perhaps. But I know that they live. I can arouse them to life at any moment I wish."

He paused. "I am old. I have no heir; and I want the result of this work to be given to the world. The world must do with it as it will."

"And your creatures really live," Douglass said when he could find his voice.

Pontius nodded. "Only yesterday I saw that one there," and he pointed to one of the imprisoned men, "making efforts to get out of his tube. The human desire for freedom, of course, and that fellow is a particularly pugnacious member of his species."

FROM the streets outside came a sudden shriek of police sirens. Douglass sat up with a jolt. The scientist appraised him quizzically and glanced at the tubes. The reporter heard him mutter something incomprehensible as he tensed in his swivel chair. He glanced toward the two synthetic men.

The green, fire-shot eyes of one were roving over the room. Douglass clutched his papers and pencil tightly in a trembling fist, and watched silently in awe. Dr. Pontius half-rose from his chair in a tense attitude. Then the synthetic creature lifted a feeble hand and ran it nervously across his face. A cry of fear clogged the reporter's throat. He struggled to down it, but it came forth in a terrified grunt.

"Good God!" he groaned. "He's coming to!"

"Silence!" hissed Dr. Pontius severely. "Those damned sirens! Their vibrations have awakened my subjects before I was ready for them!"

Douglass watched the synthetic beings in peculiar fascination. His brows were contracted into a frown that bordened on stark terror. It seemed to him that something like an electric current passed from the tubes to Dr. Pontius, making him as rigid as steel. The scientist gripped the arms of his chair so tightly that his knuckles showed white and bloodless.

So distinct was the impression of the reporter that there was some mystic, unfathomable tie between Dr. Pontius and his synthetic creations, that he almost dropped his

*Radiant energy is classified according to the wavelengths of the rays. There are the visible light rays whose wavelength is between .0000306 and .0000155 inches. Wavelengths of energy longer than the longest light wave gives us the infra-red heat waves and still longer waves gives us radio. Waves shorter than the short waves of light are the ultra-violet, still shorter are the X-ray which are about .0000004 inches in length. Gamma rays of radium are still shorter being about 1/1000 the length of the X-ray while at very end of the spectrum we have so far discovered, are the cosmic rays being less than a thousandth of the length of the gamma rays. The Q-ray therefore is an extremely short wavelength lying between the gamma ray and the cosmic ray.

pencil. With a startled gasp he pocketed it safely with his papers and fumbled nervously for a cigarette. His taut nerves were shattering and he had a strange premonition that something was going to happen. Something dire and untoward. A weird chill seemed to permeate the room suggesting violence and death. It made the reporter experience hot and cold sensations from head to foot.

Dr. Pontius watched his subjects in silence. A sense of awe and apprehension placed itself upon him. There was a marked change of expression in the faces of the synthetic men in the tubes. Gone was their seemingly lifeless sleep. Their emerald-green eyes that were flecked with fire stared out into the gloomy laboratory with unblinking steadiness. The bodies began to squirm suddenly, weakly. The creature that had appeared on the verge of death had strangely taken on new life. He showed even more strength now than the other.

Then Douglass felt the full force of their stare. As they swung their fiery eyes upon him, he felt a sensation of nausea in his vitals. His stomach seemed to turn over completely. There was a powerful something in the eyes of the creature that made him shudder and feel sick. It seemed to him that a faint, diabolical grin formed on their lips, remaining as if glued there.

"God!" he mumbled under his breath. "What a terrible curse they are to humanity!"

His eyes flashed grimly as he fought to remove them from the leering faces behind the glass. Dr. Pontius eyed him thoughtfully and laughed quietly. He spoke in an almost inaudible whisper that made the reporter start.

"I will ask you to remain as my guest tonight, Douglass," Pontius hissed softly, tensely. "I will need your help."

The reporter stiffened. He stared for a moment apprehensively at the scientist, then shook his head.

"I'm sorry, sir," he whispered nervously. "I cannot possibly remain. The service is waiting for my press copy—"

"Tut! Tut!" Pontius countered. "Unmistakeably you are afraid."

Douglass smiled grimly, his lips feeling strangely tight across the teeth. "I am uneasy," he snapped in muffled tones, "but not afraid. I have seen men hanged and electrocuted, and dead, decayed bodies in the police morgues. As a reporter I've had to handle some, but never have I encountered such a horrible experience as this. No, Dr. Pontius, I am not afraid. I beg to be excused, nevertheless."

Help Needed

DR. Pontius shrugged resignedly. "Of course I would not hold you here against your wishes," he muttered disappointedly. "I thought you would welcome the chance to aid me as a means of bettering your story. It will be necessary to remove my subjects from the tubes tonight. It is too big a job for me to handle alone. I will have to call on my niece for help if you insist on going."

"You mean you would get a woman's help?" Douglass inquired dumbly, incredulously. "Why, you don't even know what the creatures might do!"

"You are correct, young man," said Pontius stiffly. "I don't know what will happen. But Allanna, my niece, has often helped in the laboratory. In fact she seems quite fond of my subjects."

Douglass shuddered again and cursed his own emotions of fear. He was afraid to remain and knew it. Something in his subconscious mind advised him to go, but a greater force held him. He could hardly picture a woman, doubtlessly young, handling such awful creatures as the tubes contained. He realized that if the subjects became uncontrollable, old Dr. Pontius would be little protection for his niece. What then? He would never be able to forgive himself if anything happened in the place after his departure.

Before he could prevent himself from giving his final answer, the words fairly splurged from his tight lips. "Then I'll remain, Dr. Pontius," he whispered, squirming uneasily in his seat, "not because I want to, but for your protection. Something might happen. I have a hunch—"

"That's fine, Douglass," the scientist interjected. "Just remove your coat. I'll give you a robe after I call Allanna."

"You—you are going to bring your niece in anyhow?" the reporter gasped brokenly.

Dr. Pontius nodded grimly. "She wouldn't want to miss it," he mumbled. "In fact she asked that I let her in on the work. I'll need her, too, for she's a trained nurse."

The scientist turned to his desk phone, lifted the receiver and pressed a button on the call-box. Douglass thought he heard the faint tinkle of a bell not far away and wondered if Allanna lived with her uncle in the big house that was built around the laboratory. His thoughts were diverted by Pontius' muffled voice.

"Allanna," the scientist half-whispered. "Can you come to the laboratory at once? The time has arrived to remove the subjects from the tubes."

The reporter shivered slightly as he began removing his coat. The sound of a musical voice reached him as it came over the wire to the scientist.

"Why of course," he heard Allanna's reply. "I was just wondering when it would happen. But isn't it a trifle early?"

"Ordinarily they should not have been removed until the end of this week," Dr. Pontius said, controlling a voice that was filled with excitement and suspense. "The awakening is a bit premature due to the vibrations from some sirens. Then you will be right down?"

"Right away, Uncle Cliff," she replied a trifle eagerly. "Anyone there to help?"

Dr. Pontius automatically glanced at the reporter. Douglass stood coatless, rolling his sleeves.

"Mr. Douglass, a reporter, is here, Allanna," responded the scientist. "He will help."

"Oh," said the feminine voice. "Not much there, but it will come in handy. I'll be right down."

CHAPTER III

The Creatures Live

THE reporter's face reddened and his ears stung at the insinuation of the invisible woman. Before he had time to decide if he resented it, Dr. Pontius grinned up at him, went softly to a closet and handed him a linen gown.

"Protect your clothes, Douglass," he said quickly. "You'll find this an unpleasant job."

Douglass agreed silently that it was not the least bit inviting. Inwardly he rebelled at the thought of touching the greasy subjects in the huge tubes, but he steeled himself to the impending ordeal. Quickly he donned the gown, then glanced at the synthetic creatures.

The diabolical grins that had been on their lips had given away to murderous leers. The reporter recoiled a trifle when one of them cast him a side-long glance. Twin jets of fire seemed to come from those fiery eyes to sear his very soul. They bit into him like blades. He turned to Pontius.

"Are you sure that it will be safe to release them, doc?" he inquired tensely.

The scientist tied the belt of his gown behind his back and looked at the reporter calmly.

"Certainly!" he replied nonchalantly. "Moreover it must be done, otherwise they will die and my life's work will go for nothing."

"What do you plan to do with them?" Douglass blurted.

"That, I have not fully decided," Dr. Pontius stated, advancing. "For the present, I'm going to try to teach them to be house servants and drill a little sense into them."

"Then they will emerge from the tubes dumb and witless?"

Dr. Pontius laughed quietly, but Douglass noticed that it was a dull, humorless laugh. Then his face sobered and his eyes sparkled with the mysterious light of functioning genius.

"An infant is dumb and witless when it is born, Douglass," he nodded. "My sub-

jects are men in stature but will emerge from the test tubes with the intellect of a five-year old. I will be forced to develop their brains, such as they have. The brain runs second in all human mysteries and while I have succeeded in creating synthetic life, I do not profess to have solved the mystery of thought and subconscious phenomena. Perhaps the next experiment will show better results in that line."

The reporter gasped aloud with a sucking in of breath. "Then you are actually going to try it again?" he asked, mouth agape.

Dr. Pontius was on the verge of making a reply when the door bell tinkled. His attention was diverted and drawn to the lock control. He went to his desk hurriedly and pressed the button. Douglass glanced at the door expectantly and in a moment it swung open. Into the dismal room walked the only bit of sunshine he had seen since arriving hours before.

Allanna was like a beautiful flower in an ugly vase. She was young and fairly radiated sunshine. Her cheeks seemed to glow even under the subdued illumination of the dreary, dismal laboratory; and her eyes, a deeper shade of blue than the scientist's, sparkled with a frank, understanding tenderness. She was dressed in the spotless white of a trained nurse. From under her starched cap protruded curling whisps of auburn hair.

Douglass felt that never before had he beheld such a beautiful girl. Before her arrival, he had mentally visioned her as skinny, curt and undemonstrative. He was completely bowled over now and he gaped at her in astonishment when she paused a few feet away from him.

"Good evening!" she said in a soft, musical voice. "You are Mr. Douglass?"

The newspaper man shook his head eagerly, forgetting entirely that he was immersed in the dreary gloom of a womb of science.

"Douglass—Morton Douglass," he stammered. "You are Allanna, Dr. Pontius' niece?"

She smiled warmly. "Uncle calls me Allie," she said. "I've read and digested many of your scientific articles, Mr. Douglass, and found them charmingly written and precisely correct."

"Thank you, Miss Allanna," he grinned. "There's nothing more disgusting than rotten scientific reports. I strive to get mine correct. That is why I am here tonight—to get your uncle's startling discoveries first hand."

They were interrupted by Dr. Pontius. "No need to introduce you two," he chuckled quietly. "You'll get along. Now let's get busy. Allie, you know what to do. Mr. Douglass will help me with the tubes."

SUDDENLY Dr. Pontius snapped an electric switch. Instantly the laboratory became a place of brilliant light. The young Mr. Douglass gave a start. His pulse beat a tattoo at his temples. Quickly he glanced around the room. The gloom had vanished and he found that the place was not so dismal as it had been under the glow of the single frosted desk lamp. Yet the peculiar revulsion for it all still clung to him. The four human skeletons stood out now in high relief against the wall. Their sightless sockets seemed concentrated upon him. He winced at a discovery.

The skeletons were not wired at all as he had suspected! They were indeed fresh, green bones partly dissolved in the devastating green jelly! With a sinking feeling he withdrew his popping eyes from them and glanced at Allie. She was making ready two operating tables in the center of the room. Her back was turned to him so that she did not observe the panicky look in his eyes and the pallor in his cheeks.

He was glad of it for he did not want her to think him a coward. He could have faced death easily knowing what confronted him. But here in this place of unknown things, unnatural life and inhuman sorcery, he was all but completely unnerved. Nor could he have been blamed for it. Only long association with such dreadful things could make a man or woman indifferent to them. Neither Allie or her uncle minded the strange combination of life and death in the least.

The place now seemed like a sepulchre. The silence was oppressing. The very at-

mosphere was filled with a high tension, as if a bomb lay in the middle of the place with a burning fuse nearing the deadly charge of explosives. Douglass sensed danger of an unknown degree and turned to the tubes to see the synthetic creatures appraising him greedily.

Dr. Pontius motioned to him from where he stood, just beside the first tube. Inside of it the creature leered, his lips curled into the snarl of a savage jungle beast. The reporter looked hard at him and found that he was no longer transparent. He glanced at the other man. Gone also was his transparency and he appraised the scientist questioningly. As though he sensed what lay in the reporter's mind, Dr. Pontius voluntarily enlightened him.

"They were made transparent by this N-Ray projector," he pointed to the globe above them. "I arranged that so I could see what was taking place within their anatomies at all times. But you will find that they have a healthy look now."

The newspaperman looked at them again. Indeed they did appear healthy. Their skin seemed like green silk and as smooth as silk. But it still seemed ghastly and unearthly. Something about it created a sense of horror in the reporter. His soul rebelled against them and he wondered if Miss Allanna or her uncle had any such feelings.

Before he had time to inquire about it, Dr. Pontius announced himself ready to remove his subjects. The reporter's blood pounded. His lips tightened across his teeth again and his hands went into balls of muscle and bone voluntarily. He watched the scientist as he began removing the sustaining bands from about the tube. Douglass felt his flesh creep. He stiffened strangely when Allie came up and stood beside him, their elbows brushing. She spoke to him in a very low whisper.

"Aren't you thrilled, Mr. Douglass?" she asked, bubbling over with excitement. "I think it's wonderful!"

"Yes, er—I am, Miss Allanna," he replied shakily. "I'm so thrilled that my spine shivers!"

She gave an almost silent laugh and he felt her deep-blue eyes upon him. Fearful lest she discover his weakness, he did not look at her, but watched instead, the creature within the tube that Dr. Pontius was working on. The leering subject was gazing at his creator now, the tips of his fingers working convulsively as though eager to get at the throat of the scientist.

"Aren't you the least bit afraid, Miss Allanna?" Douglass blurted suddenly. She chuckled.

"Not in the least," she replied sincerely. "Are you, Mr. Douglass?"

Delicate Work

HE ventured a glance at her. She was watching her uncle. Her face was aglow with expectantcy. Not a single quiver of revulsion ran through her and the reporter marvelled at her remarkable equamnity in the face of such horrors. She was as calloused to them as her distinguished uncle.

"Now," said Pontius crisply. "One more thing to do, and then we'll be ready to remove them."

He wheeled over to the tube a large stand, the lower part of which held a box on which were a row of black buttons. A long thick rod projected upward to a queer-looking metal globe. Pontius adjusted the stand in front of his creation, and sighting along it for a moment, pressed one of the black buttons. Instantly a sharp dazzling beam of light, emanating from the globe, bathed the synthetic man in its glow. For a moment, as Douglass gazed in awe, the creature remained motionless then his arms began to move slowly up and down through the confining liquid, and his features took on the look of one awakening from a long sleep.

"Now, Douglass," said Pontius suddenly, "on the other side of the tube, you will find a crank. Turn it slowly in a clockwise direction until the tube is inclined fifteen degrees. Then we'll open up the tube and release our good friend."

Hesitantly the reporter went to obey. He grasped the handles as directed and was amazed to feel the tube slowly incline. When the inclination had reached fifteen

degrees, he opened up the tube, leaving the synthetic man exposed as though he stood upright in a glass coffin.

Expecting to see the creature fall out of the tube and at him, Douglass quickly set the half-tube aside and partly crouched. The being stared at him strangely but made no effort to get out.

"I don't believe Joe Agar would hurt a flea," laughed Allanna, amused at the reporter's actions.

Douglass calmed easily. "Joe Agar?" he squinted at her, curiously. "Is that what you are going to call the creature?"

"What else could we name him, Mr. Douglass?" Allanna smiled. "Agar is the substance from which they sprung. Hence the name. The other one is Jack. Their names are Joe and Jack Agar."

"Brothers under the skin?" the reporter grimaced.

"Deeper than that, Mr. Douglass," the girl replied quickly.

Her attention was suddenly drawn to her uncle who spoke softly at her.

"Are you ready to receive him, Allie?" the scientist asked without pausing in his work. "Strait-jackets for emergency, ether and all that?"

"Yes, doctor," she responded, dropping all interest in everything but her professional duty as a trained nurse.

"Then take your post," Dr. Pontius ordered curtly. He turned to the reporter. "Douglass, you stand ready to support the subject in event his weakness causes him to topple when I let the jelly out into the hole at the bottom of the tube."

"Weak, eh?" Douglass muttered to himself. "I'm damned glad of that. Makes me feel better."

"What's that, young man?" Dr. Pontius snapped sharply.

"Nothing, sir," responded the reporter. "I was just humming a tune."

"Good!" ejaculated the scientist. "I like to have around me, men who are fearless and callous. You are improving, sir."

"Thank you, doc," Douglass said evenly. Then to himself: "If he only knew the truth!"

Douglass was so utterly startled by a sudden groan from the curled lips of Joe Agar that his face turned even more pale. The creature sagged forward a trifle as the jelly slowly filtered through the now opened hole. Instinctively but revulsively, the reporter reached forward to support him. His hands touched the greasy body. It felt as clammy as the skin of a snake and it made him tremble. He felt his flesh creep, but stood rigid, both hands under the armpit of the artificial man.

CHAPTER IV

The First Death

JOE Agar swung his steady unblinking gaze upon the newspaper man. Douglass avoided the green eyes by concentrating on the creature's hairless head and aboriginal brow. He shook almost violently, for the somber, ominous atmosphere with its invisible menace, was striking deeply at his soul. Danger seemed to lurk on every hand and the reporter sensed it even more when the final protecting fluid had slipped from the creature's body.

Instantly Joe Agar toppled limply into the reporter's arms. The scientist quickly went to his aid and together they carried the weak synthetic creature to a table. Allanna had spread upon it clean sheets and blankets. She stood at its head, a mask in one hand and an ether container in the other. Evidently they had not expected the creature to emerge in such a weakened condition and they were ready to subdue him if need be. He was placed under the blankets and the girl laid aside her instruments of mercy.

"He is too weak to be harmful," she said calmly, "and too feeble to stand an anasthetic."

"That is correct, Allie," said her uncle. "His respiration is dangerously low. Just cover him well and let him sleep until morning. I think he'll be alright. Now Mr. Douglass, if you don't mind, we'll remove the other one."

Silently they returned to the tubes leaving Miss Allanna bending over Joe Agar with a stethoscope attached to her ears.

He heard her gasp and glanced over his shoulders. She was looking after her uncle questioningly but said nothing. There came a dismal groan from the table. Dr. Pontius turned suddenly and retraced his steps toward it.

"What was that, Allie?" he asked apprehensively, as though sensing something untoward in the sound that had escaped his subject's lips.

Miss Allanna looked up at him curiously. "I—I don't know," she replied softly. "Unless he is dying."

Douglass came up beside her and looked into the grotesque face on the sheets. Joe Agar seemed to be breathing his last. His lips were still curled into a foreboding sneer and his lids were wide. A purple rash stood out on his brown and a greenish liquid perspiration fairly surged from his over-large pores.

"Why, he's dying!" exclaimed the reporter with a feeling akin to genuine joy. Through his mind raced a wild thought. "I hope he does!" he thought. "A thing dies, then we'll only have one, his brother, to reckon with! No doubt about it, they seemed to have taken a form of life to purposely revenge themselves on man who violated all laws of nature!"

"Silence!" snapped Dr. Pontius with a scowl. He reached up suddenly and took a green bottle from the shelf. As if ordered to do so by mental telepathy, Allanna pulled one of Joe Agar's arms out into the open. Dr. Pontius emptied the contents of the bottle into a glass tube under the table and calmly began to transfer it to the veins of the dying subject. Douglass shuddered as a silver tube was inserted in the artery of the arm, and turned away, appalled. Something drew him to the other creature. He paused in front of the big tube, to stare meditatively at the leering features of Jack Agar.

He felt an urge to bolt the place, then suddenly he came down to earth. If he ran out on this terrifying experiment, he would never hear the end of it. After all, he was a newspaper man on an important story. He must continue with the ordeal whether he wanted to or not despite the fact that Jack Agar was going to be more difficult to handle than the other.

Jack Agar virtually chewed at his lips in a strange, sinister emotion of savagery. Muscles seemed to bulge under his silky skin. His fingers twitched with the restlessness of a mad man. Douglass realized that there was nothing weak about him. He heard Dr. Pontius emit a dismayed groan and turned. Allanna was working a small pulmotor frantically, but the scientist waved her aside.

"Never mind, Allanna," he said ominously. "He's done! Dead!"

THE reporter shrugged as she pulled a sheet over the greenwhite face. Across his lips flashed a smile. Piously he glanced upward and shook his head as though to offer thanks to the invisible Creator of all things, for having interfered with this horrible violation of nature's laws. He heard Allanna stifle a sob, and wondered if she mourned the death of the synthetic creature. But no, it was not that. She sympathized with her uncle who stood beside the bed dejectedly, like a man who has lost his all. He jerked erect suddenly and came toward the reporter.

"We're not beaten yet, Douglass!" he muttered. "I rather suspected Joe Agar would pass on, but I have little fear for Jack. He'll live to prove my father's discoveries to the world."

"I hope so, Dr. Pontius," lied Douglass glibly. Yet he felt genuine sorrow for the old scientist who had spent his life to evolve man, then be forced to watch the results of his genius die at the point of success. "He is indeed filled with vigor and—uncontrolled deviltry."

"You are right!" Dr. Pontius replied promptly. "He has developed far beyond his brother. That is why I valued his life more. Though he has scarcely less than the brute capacity of the simians and will be hard to control. Still, I have no fear of him, for I will bend him to my will by hypnotic suggestion."

Douglass somewhat doubted the genuineness of the scientist's expressed fearlessness. There was something in his tone now that

belied a kind of fear for the creature in the tube, but the reporter argued with himself that it might be a tone of sadness at the death of Joe Agar. Yet his uneasiness increased and he stirred restlessly while Dr. Pontius dismantled the tube. He watched with unrestrained forebodings.

Jack Agar possessed the strength of a maniac. This might appear strange considering the fact that the creature had never been permitted to move freely. But Dr. Pontius had used special care to build up his muscular system. Scarcely had the reporter removed the front section of the tube than the synthetic man lashed out with a frenzied left hand to clutch at him.

"Hadn't you better use a hypodermic needle on him, Dr. Pontius?" he asked, trembling. Then he added in a grim whisper: "I'll sock him square on the button if I have to!"

"No! No! No!" said Dr. Pontius severely. "The shock may forever weaken his senses. Do not raise a hand against him, young man! I warn you!"

Douglass suddenly sensed the nearness of Allanna. She had crept up unnoticed to watch the work of releasing the bestial subject and had sen Jack Agar's savage thrust at the reporter. There was an unmistakable expression of alarm on her features, yet she seemed calm and collected. She peered intently into the maniacal face of the struggling creature, her deep-blue eyes boring into him steadily.

As though compelled to do so by some powerful, invisible force, Jack Agar gradually ceased his struggles. The green fire seemed to vanish from his eyes. They became soft and languid as the eyes of a child looking up into his mother's kindly face appealingly. Still, Douglass thought he detected an evil gleam in the look. His gaze traveled from the creature to Allanna. Across her lips flashed a pleased smile.

"Be a good boy, Jack," she whispered softly, never moving her eyes from him for an instant. But whether Jack Agar understood what she said, Douglass could not decide. He very much doubted it however and wondered what force she had applied to him to bring him to submission. Had she used hypnotic suggestion or just plain hypnotism on a weaker will? Or was the creature merely fascinated by the charm of the girl and did the evil gleam in his eyes spell ill for her? Whatever it was, she had certainly subdued him, her eyes soothing him like music soothes the savage beast.

Dr. Pontius glanced at her presently. "He'll be alright now, Allie," he said smoothly. "You may rest a moment. You must be tired now."

"Oh, I'm alright, Uncle Mark," she responded, trembling slightly. "You can go ahead. The table is ready."

CHAPTER V

Uneasy Hours

THE scientist gave her a warm, affectionate smile and turned again to the tube. Quickly he surveyed the silent, foreboding subject whose eyes followed Allanna as she turned away. Douglass crouched instinctively expecting the creature to leap from his coffin of glass. But Jack Agar made no such move. He seemed thoroughly fascinated by the girl and watched her steadily through unblinking eyes. The reporter was amazed to see Dr. Pontius lead him easily from his container directly to the table. He followed cautiously, tensely, ready for any sudden outbreak from the synthetic man.

With his subject prone on the table, Dr. Pontius lost no time in strapping him down by the ankles and wrists. Jack Agar made no protest but kept his orbs glued on Allanna. Reaching to the wall quickly, the scientist grasped a cord and lowered a great, green-shaded lamp of the same proportions as the table. Without hesitation he switched on a brilliant light that sprayed the subject with an emerald glare. Jack Agar writhed as though he lay on a bed of coals. His muscles bulged and snapped; then Dr. Pontius flicked his open hand before his face like a hypnotist working on a subject. The synthetic man ceased his struggles and lay still under the flood of light.

The reporter heaved a sigh of relief. He opened his clenched fists and relaxed his

numbed fingers. The nails had bitten into the palms, leaving crescent scars. His hands trembled in reaction to the released tension. Suddenly he found himself weak, very weak. Dr. Pontius appraised him, glancing at his watch.

"It is after midnight, Douglass," he said, showing no reaction to the strain and uncertainly of his work. "Perhaps you had better retire. Allie will show you to a guest room."

"You sure you won't need me again tonight, Dr. Pontius?" the reporter inquired dismally.

The scientist nodded. "No, Douglass," he said simply. "I will not need you. Let me thank you for your help."

They shook hands. "Then if you don't mind, I will retire," replied Douglass, rising. He walked over and stood beside the table for a moment to stare at the synthetic man. Jack lay perfectly still now, as still as his sheet-covered brother near him. His unblinking eyes stared upward at the brilliant, illuminated tubes in the flood-lamp.

Douglass felt a nauseating sensation surging through him as he peered into those dread orbs. They reminded him of a picture of Satan he had once seen. The eyes had been wide and menacing. He felt the roots of his hair tangle. He turned away with a desire to quit the place forever. When he confronted Allanna he recalled quickly that he had a hunch, a persistent premonition that something was going to happen. Seeing her again caused him to forget instantly his desire to leave. Her sunny smile again captivated him.

She held his coat and hat in her hands. "You will not need the gown any more, Mr. Douglass," she said. Her voice was soft and cheery. He had forgotten about the white linen gown he wore and quickly shed it. She helped him with his coat and together they went out of the ghostly laboratory, leaving Dr. Pontius alone with his skeletons and his subjects, life and death and evil shadows hovering about him.

"Is your uncle going to work all night, Miss Allanna?" the reporter inquired as they entered a door leading off from the hallway and began mounting a pair of winding stairs that creaked under their weight. The sounds made the reporter shiver, for they sounded mysterious, spectral.

"I do not believe so," she said promptly. "But he has much work to do. You see, he plans to preserve the body of Joe Agar and intends to place it in the preservatives tonight."

"Going to pickle him?" the reporter gasped.

The clear ring of her corresponding laugh made him turn to look at her. She flashed him a serious glance. Could nothing ruffle this girl's cool indifference to the stark realities of the place? He wandered if anything could suspend or break her callousness even temporarily.

"That's it precisely," she commented softly. "The delicate texture of artificial flesh makes preservation necessary at once. Now that Joe Agar is dead, Uncle Cliff wants the preserved body to go to Tyburn College."

THE house of Dr. Pontius, the reporter soon discovered, was almost as weird and spectral as his laboratory. Indirect illumination made it a place of lurking shadows that seemed to blend perfectly with the mystery of the man himself. In the living room to which Allanna guided him were many preserved specimens of life, arranged in glass containers on shelves and pedestals. The entire room shrieked silence and dark mystery. Allanna was the only bright object in the place and Douglass was glad to rest his tired eyes upon her sunny face and supple form.

She invited him to the divan and for the first time since his arrival he regained some of his composure.

"Did I hear you say you were busy every evening, Miss Allanna?" he inquired strategically to pave a way for future meetings. She appraised him cooly.

"Oh, no," she replied, suppressing a yawn. "I have several nights open."

"That's excellent!" he applauded happily. "How about the others?"

"Well," she said mischievously, "you wouldn't expect a girl to be without at least one boy friend, would you?"

The reporter felt a vague feeling of jealousy surge through him. His lips tightened strangely again, but in jealous embarrassment.

"Not a beautiful girl like you," he said, slightly confused. "But I was hoping that I might see you more than several nights a wekk."

Allanna shrugged and was about to reply when Dr. Pontius came suddenly into the room. He was smiling oddly.

"You are indeed a fast-working young man, Douglass," he said. "I wish you luck!" He turned to his niece. "Hadn't you better retire for your beauty sleep, Allie?"

Allanna yawned and stood up. "I believe I shall, Uncle Mark," she responded. "If Mr. Douglass will excuse me . . . . "

"Of course," said the reporter, his face stinging. "Good night!"

Dr. Pontius cut him short. "Come along, young man," he ordered. "I'll take you to your room. The butler will call you for breakfast."

Side by side they followed Allanna to the second floor. The house was as silent as a tomb. Allanna flashed them a warm smile as she turned into a room from the hall above. Douglass' blood raced at it, for it had told him much.

As he entered his room directly across the hall from the one taken by Allanna, Douglass felt a strange feeling come over him. Just why, he did not understand, but he seemed to sense the presence of death. Something akin to a cold current shot through his veins as he picked up a pair of silken guest pajamas. He managed to control himself as he spread them out and speculated on the size. After undressing he climbed into bed and counted sheep until he fell into a troubled, restless slumber.

During the following hour, his subconscious mind ran the entire gamut of sensations. Wild dreams and nightmares made him toss and roll. His lips became feverish. From them escaped weird sounds that in themselves even went to further terrorize him. They appeared to him to come from the curling lips of the synthetic men. The body of Joe Agar seemed to hover over him like a dismal ghost. The wide, Satanic orbs of the living Jack stared at him, burning like twin fires and searing his soul.

Then something happened that brought Douglass wide awake. What was it? Was his imagination running wild or had his ears detected the faint, stealthy footsteps of a bare-footed prowler? Sitting rigid in bed, he waited for the sounds to reach his ears again. The room was pitch dark. In front of his eyes danced gray, ominous shapes, the fancies of his strained vision. Suddenly he heard what he thought sounded like a dull thump, as though a body had collided with a wall or the floor. Then the silence became ominous.

Trembling from head to foot and chilled to the marrow with a cold, clammy feeling, he softly got out of bed and glided to the door. A skylight over the hall bathed it in a pale, phosphorescent glow from a high moon. At a glance he saw that Dr. Pontius' door was open. His room was beside Allanna's and the scientist had closed his door on entering. Douglass had seen that, but why was it open now? Was Dr. Pontius prowling around the house? He wondered if the scientist had made the unnatural sounds.

AS he watched the open door, Douglass thought he saw a green ghastly face appear in it for a moment. His blood ran cold and his knees banged together. Not a sound reached his ears, altho he listened with his hands cupped behind them.

"Clang! Clang! Clang!" The great antique clock in the living room chimed suddenly. Douglass almost screamed. Then a grotesque face appeared in the scientist's doorway. The reporter recoiled like a snake. Almost at once he heard the pad of bare feet in the hall and by sheer force of will was he able to look out again.

The hulking form of Jack Agar was retreating slowly down the hall! From his wrists and ankles dangled the torn straps that had held him to the table in the laboratory!

"My God!" Douglass groaned through dry, parched lips. As though hearing, Jack Agar paused abruptly and turned his fiery

eyes back from whence he had come. They seemed like the orbs of a tiger flaming in the night. Then he turned suddenly and entered another room, two doors beyond the one occupied by the scientist. More silence followed, beating down upon the reporter like the blows of a triphammer.

What had Jack Agar done in the scientist's room? It seemed to Douglass that his hunch had materialized in the dead of a horrible night. But had the synthetic man actually killed his creator? The reporter could wait no longer to find out. With a bound he leaped into the hall and ran silently to the opposite room. Without hesitating he entered, fumbled for a light-switch near the frame, and found it. The switch snapped.

As part of his duty as a reporter, Douglass, had seen men hanged. But now as he crouched against the wall, he was terrified and appalled at what his eyes beheld. Dr. Pontius lay in a corner beside his bed, his head crushed like an eggshell!

The reporter suddenly heard another dull thump and a hiss of air from a dying man's lungs. Swiftly his mind searched for a possible meaning to this. Then it dawned upon him that the butler must have fall victim to the terror that was slinking like a mad gorilla through the house. He again heard the indistinct pad of feet. His blood throbbed at his throat and temples, sending cold, clammy chills over him. Where would the beast of the test tubes go next? To his or Allanna's room?

Douglass crouched just inside the death-room door. A great shadow, ghastly and spectral, fell across the sill. He felt an urge to scream and smothered it. The murder-beast slunk past, his long arms dangling strangely at his sides, his lips curled into the same ominous leer, his nude body glistening under the light that filtered into the hall.

The reporter was so utterly appalled that his wits seemed dull. It was fully a minute before he overcame his horror and stole a glance into the hall. The synthetic man crouched before the closed door of Allanna! He looked toward the reporter as if by instinct. Douglass dodged back out of sight and waited, expecting to see the beast tracking him down. After a few seconds he looked out again.

Jack Agar had vanished. Douglass' heart almost stopped. Before he could control himself, he had leaped out into the hall. Instantly there came a blood-curdling scream from Allanna's bedroom. With terror striking at his mind, the reporter ran for her door. It was open wide and her room was filled with beastly muttering and stifled cries. Then he heard plaintive pleadings coming from the darkness. Pleadings from horrified feminine lips.

Young Mr. Morton Douglass could stand no more. Mumbling dire things he bounded into the room, pausing to switch on the lights and take stock of the situation.

The synthetic man was bending over Allanna as she lay in fear on her bed, her arms outstretched to ward off his deadly, murderous fingers. Douglass saw at a glance that he had her by the throat now and in a twinkling would beat her head to a pulp. The beast paid not the slightest attention to the sudden flood of illumination, but seemed bent only on murder.

Douglass had a glimpse of pleading eyes peering at him through the beast's arms. For the first time in her life, Allanna was in mortal fear. The expression on her features caused the reporter to go stark mad. With the roar of a beast he flung himself forward, felt his nerveless fingers touch the clammy flesh of Jack Agar, and gain a hold.

The Secret Destroyed

IT seemed to him then that nobody could be closer to death, but in his insane fury it mattered not whether he came out victorious or had his head smashed in, so long as he gave Allanna a chance to escape. Gaining momentary control over his reeling, infuriated senses, he yelled loudly to the girl.

"Run Allanna!" he shouted, using precious breath that he knew would be needed to protect himself from Jack Agar. "Call the police!"

Allanna neded no urging. Like a wood nymph she sprang from her bed and ran, terrified, into the hall. Douglass heard her

calling desperately but futilely to her uncle. Her feet sounded on the hall floor and then the reporter heard her scream again. He did not doubt but that she had discovered her uncle's gruesome form, stilled in death.

Jack Agar's lips became discolored with a green, ghastly foam giving him the appearance of a rabid animal, as he turned slowly to face his antagonist. From his throat came the startling snarl of a jungle brute making a kill. But his actions were sluggish because of his dull, undeveloped wits. His great arms writhed through the air like serpents and the reporter ducked under them.

Douglass stepped nimbly aside and delivered a clean, right-handed blow on his adversary's unwholesome chin. The synthetic man's eyes went strangely dull and listless, losing much of their savage, murderous lust. He faltered a trifle and ambled backward. The newspaper man followed like a trained pugilist and led again with a vicious left.

The delicate flesh of Jack Agar's chin split in a horrible gash. A green liquid sprayed over the reporter, smelling like the damp, sour weeds of the sea. His eyes blazing furiously he lashed out with a potent savageness. Across his vision was a curtain of red and he cast caution aside to deliver another terrific right. Then Jack Agar's waving arm caught him in the grip of a boa. He sobered in the instant and was amazed at the supernatural strength of the creature. Jack Agar seemed to have the power of steel vises in each arm and they closed around the small of his back with menace.

The newspaperman felt an agonizing pain through his middle. His blood seemed to turn to ice and his heart appeared to have suddenly stopped. Something told him he was going to explode. Then he looked into those terrible, fiery orbs. He tried to scream, but his voice was dead. Great balls of fire danced before him and he knew he was going into unconsciousness, for a fathomless black abyss yawned under them like open space. He felt himself falling, falling with a terrific wind racing past his ears.

Then as it seemed he was at last going to strike terra firma at the bottom of the pit, he heard a terrific explosion. Through his reeling head ran the thought that he had actually exploded and his astral body was floating over his mortal remains. Something hit his ghost and knocked it strangely aside. Then he thought that he was gloating over something.

And that something looked very much like the still form of Jack Agar with a round hole in the center of his brow from which poured a smelly green liquid. Other forms moved about like weaving ghosts; then he felt a cold, icy something on his forehead. Gradually objects began to assume definite shape and finally out of a jumbled nothing he recognized Allanna. From her deep-blue eyes ran glistening tears.

"Oh, Mr. Douglass!" he heard her sob tearfully. "He did not kill you! Oh . . .!" He saw her shudder violently and then a blue-uniformed man lifted her erect.

"Take it easy, young lady," advised the officer. "It won't do to go into hysterics. He's alright!"

Eager hands lifted the reporter to his feet. His head reeled and he lurched sideways. Hands caught him. Water was forced down his parched lips. Rapidly he emerged from the cloud behind which hovered death and oblivion.

"W-what happened?" he managed to ask as he stood, tottering. A bluecoat glanced to a heap on the floor and nodded.

"He had you in a bad way, young fellow!" the officer said with a grin. "In another second he'd have bashed your head like an eggshell! Murphy's slug got him right between the eyes."

Allanna shivered and hid her face against the police captain who supported her. She sobbed convulsively. Douglass had a sudden thought.

"Did he kill the butler, too?" he blurted, feeling the strength returning to his trembling legs. He searched the officers' eyes. The bluecoats nodded as one.

"And the old man in the other room," said one of them smoothly. "Bashed in . . . . "

"I know all about that," the reporter cut in quickly to save Allanna from hearing

further. "The beast will never kill another man, I hope!"

"Aye!" interjected the captain. "He's as dead as a door-nail!"

"I had a hunch something like this would happen," said Douglass shaking his head sadly. "Dr. Pontius violated all the unwritten laws of nature by creating synthetic human life. Man should not try to duplicate the work of the Master Creator. I am sorry for Dr. Pontius, but glad that he will carry his secrets to the grave."

Douglass instinctively glanced toward his room across the hall where his coat containing his papers reclined on a chair-back. He wondered if the papers had been touched. Without hesitation he went to the room, removed the notes from his inner pocket and strode to the open fireplace near the foot of the bed. His hands trembled and he muttered softly to himself.

"He told me he had no written formula," he mumbled, glancing at a paragraph in his notes that revealed the secret of synthetic life. "So here goes the works. The secret will remain a secret as far as I'm concerned!"

A match scraped along the fireplace stones. It was held to the sheaf of foolscap. A flame illuminated the drawn features of the reporter. He held the burning documents until the flame reached his shaking fingers; then dropped the twisted mass into the grate with a feeling that he was doing mankind a great favor.

Within a year the house of horror had been transformed into one of sunniness. The pickled bodies of Jack and Joe Agar had been sent to Tyburn and with them had gone everything scientific Dr. Pontius had possessed. Allanna had fallen into the wealth her uncle had left, but her husband, the young Mr. Morton Douglass, continues to be the right hand man of Amesbury of the *Globe*.

THE END.

FOR THE JANUARY ISSUE

We offer

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What takes place far below the surface of the ocean is still quite a mystery to us because of the terrific pressure at even moderate depths. We have never been able to penetrate more than a few hundred feet, but it is probably true that strange creatures exist in the submarine depths. What they would be like we have no means of telling, but if we were to penetrate the ocean's depths as our characters do in this story, we might find some of the most amazing things that the imagination of man has conceived.

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The second installment of this masterly interplanetary story will reveal the secret of many of the puzzling events of the first installment. We will find the meaning of the mysterious Outpost established on the desolate Moon, unknown to the people of earth. Is it a menace from the limits of the solar system that the Outpost is trying to contend with? Even the Outpost does not know the answer; but flying with our characters between Moon and Earth we will get vivid glimpses into some astonishing events.

AND OTHER STORIES IN THIS BIG NEW YEAR ISSUE

ON SALE DECEMBER FIRST

The Struggle *for* Venus

By **Wesley Arnold**

Illustrated by Marchioni

It rapidly grew in intensity. It had the appearance of a half moon toward which I was rushing with frightful velocity.

THE day on which my story opens—June 6, 2012—was marked in advance as the date of a transit of Venus across the disk of the sun. It will have a foremost place in the minds of future generations of school children as the date on which the first expedition of colonists from Earth landed on the neighboring planet.

Although a broken leg prevented me from being a member of that band of brave men, my later destiny was closely linked with their amazing adventures on Venus, and it is their story, in so far as I was connected with it, that I shall set down here to the best of my ability.

An introductory word about myself is necessary. The first space trips — those venturesome leaps to the moon—were made when I was a schoolboy. They fired the imagination of the world, and I was only one of the millions of boys who resolved to devote their lives to the exploration of space. Partly because I was more persistent than some, and partly because I was more fortunate, I was able to follow the line of my ambition. What will always stand out as the biggest day in my life was that on which, my theoretical training completed, I hopped off on my first space trip, in which I circled the moon. Prior to that time Robert E. Jones and Matthew Eddy had already made their epochal trip to Venus, and I looked upon my first space voyage as merely further training that would equip me for similar exploits.

When it was decided to send a large expedition to remain at least two years on Venus and investigate the deposits of radium-bearing pitchblende found by Jones and Eddy in their brief stay, I was accepted as a member of the party, and took part in the preparations. My high expectations were rudely dashed when, a month before the start, my run of good fortune was ended by the accident in which my leg was broken. That, of course, disposed of my hope of accompanying the expedition. Dr. Franklin Sanders, chairman of the Commission for Venus, offered me the post of wireless operator, which I gladly accepted. My duties were to aid in the installation of the station which would be used to communicate with the men on Venus, and, after communications were established, to keep one of the three eight-hour "watches" at the receiving set. At the same time I was to aid in preparations for a second expedition to be sent out two years later when Venus would again be in inferior conjunction with Earth.

On June 6, 2012, then, I left an assistant in the wireless room and went to the roof of the building in Washington, D. C., furnished the Commission by the North American Continental Government. It is unnecessary for me to describe the transit of Venus across the sun's disk, for all of my readers must have witnessed the phenomen either in 2012 or 2004. I do wish, however, to record a conversation with Dr. Sanders, because it will show our expectant attitude on that day when the expedition,

THE planet Venus occupies a peculiar and enviable position in our solar system. According to the best evidence that we have it is a young world, younger than the earth, with a consequently longer period of life before it. By its distance from the sun, it is well fitted to maintain a high order of life, and for all we know, that life may now exist beneath its ever-present cloud layers. And if life does not exist on it, Venus lies in the skies a planetary prize awaiting the conqueror. According to Professor V. V. Stratonoff, an eminent Russian astronomer, the earth must some day lose its ability to support human life, and then we must be prepared if we wish to maintain our race to emigrate to a more habitable sphere. Yet our conquest of Venus is not likely to go uncontested, for it is probable as our author shows that a bitter battle is certain over this fair young world.

out 26 days, was scheduled to arrive on Venus. I was watching the sun, with the planet outlined against it, through a pair of binoculars when Dr. Sanders approached me.

"If all has gone well," he said, "we should be in communication with them in a few days, now."

"I'm sure all has gone as planned, sir," I replied. "Nothing could go wrong with Commander Jones in charge."

"He is a wonderful leader," Dr. Sanders agreed. "I share your confidence in him. Nevertheless interplanetary travel is still fraught with many perils, as you know better than I. It is a long and dangerous voyage, but I trust it has been accomplished successfully."

"Their adventures will only have begun when they land," I said. "They will still have to cope with all the dangers of a world such as ours must have been a million years ago."

"And you would give your right eye to be with them," Dr. Sanders smiled. "Don't worry, Starrett, you'll join them at the first opportunity."

WESLEY ARNOLD

I SMILED, rather wryly, I am afraid, for I knew that the "next opportunity" would not come for almost two years. From that day Venus and Earth would steadily separate until, some ten months later, they would be on opposite sides of the sun and separated by more than 160,000,000 miles, instead of a mere 25,000,000 miles as at present. No trip between the two planets could be considered until Venus again approached inferior conjunction.

Dr. Sanders read my thoughts.

"Venus won't be civilized in two years, my boy," he said, "nor in two decades. I'm sure you will have your part in the work of civilizing it, and your share of adventure. It is no secret, of course, that the present plan is to estalish a permanent colony on the planet. There must be untold resources to be developed. I can visualize the day when Venus will have a thriving population of men and women."

An almost religious light shone in his eyes as he continued.

"Beautiful cities will be planned and erected free from the blemishes that on Earth we have inherited from past ages of trial and error. Commerce will ply the seas of Venus and there will be a steady exchange of goods between the planets. Venus may come to be regarded as the 'promised land' for the inhabitants of Earth. In some future age when the earth receives less heat from the dying sun, mankind may desert its old home and move to the new world nearer the source of life."

He clapped me on the shoulder.

"These are glorious prospects that we have before us in the dawn of the 21st Century. Adventure such as no man ever dreamed of a few centuries ago! My boy, the great adventure is just beginning. I predict that you will have a big part in furthering it. So don't let your spirits be cast down now."

I do not remember what reply I made, except that I stammered my thanks for his kind words. His enthusiasm and vision were contagious, although there was nothing new to me in what he said. Later on, however, when I was back in the room which housed the interplanetary wireless set, my disappointment rose afresh. After all I had wished to be a pioneer, and it would not be the same going out with a second party two years later to find the ground broken, homes erected and a little community ready to receive us. Nothing could be done about it, however. I had missed my big chance through such a trivial thing as a fall and a broken leg.

The bone had practically healed by this time, but it was too late. The expedition had departed twenty-six days earlier, and, as we learned later, landed on Venus on that very day and near the time when the planet was seen from Earth in transit across the sun's face. I little guessed that day how fortunate it was for all concerned that I was not with them.

CHAPTER II.

Mystery on Venus.

IT was three days later before any word was received from Venus, the delay being explained by the necessity for the technicians of the expedition to assemble the wireless and getting it in working order. I still have copies of the messages received in the Washington headquarters, so that I am able to give their exact texts. They tell a dramatic story of mystery and suspense in a strange and unfriendly world.

Contact was established on June 9. I was on duty at the time and was reporting periodically to Dr. Sanders that no results had been obtained. The wavelength to be used was so low that there was no interference from Earth stations. I was tuning the set near the agreed point when I caught a faint signal. I perfected the adjustment and then waited. If it were indeed Venus calling, the signal would be repeated in exactly five minutes. Precisely at the end of that period, which I spent watching the second hand creep around the dial of my watch, I caught the signal again, much louder. It was the Venus station repeating the station call for Earth.

I tapped out the answer to show that communication had been established, and then sent for Dr. Sanders. It would be more than two minutes before the radio signal, traveling with the speed of light, would reach Venus, and an equal time before the reply could be heard.

Dr. Sanders entered the room, followed by others who had heard the good news. There were excited whispers, which I stilled with a motion of my hand. Although the message was taken down automatically by the receiving instruments, I was unwilling to risk the possibility of mechanical trouble and accordingly wrote the message down.

"Earth, attention! Earth, attention! Arrived three days ago. All O. K. We landed near mouth of Holmes River and have begun construction of permanent home on favorable site. Living in the ships pending completion of thatched roof huts. Party of hunters on first day surprised herd of sexons* and killed enough to supply us with meat for a week. Have caught several forms of river life in nets and Dr. Alexander is analyzing them. Potato trees are plentiful and the root, with sexon meat and bread, completes our diet until Dr. Alexander tells us what else we can eat.

"Have divided party in two groups and alternate daily, one group exploring neighborhood and collecting specimens of vegetable and animal life while others cut and haul lumber. The wood of the potato tree is strong and light, and the rough sawed lumber has the quality of glowing faintly for several hours after sunset. Lizards of many types and all sizes are abundant, but apparently harmless. We hope to begin work on radium field in few weeks when camp is completed. Men all gathered to wait your reply. Send greetings to friends on Earth. Robert E. Jones."

Dr. Sanders quickly scribbled the answer, which I began sending within a few minutes after the completion of this message. In the meantime the news had been flashed to all parts of the world. Congratulatory messages from notables began arriving and were transmitted to the distant party. It was more than two hours later when we said good-bye for the day.

It is remarkable that from the first there was no difficulty in communicating with the party on Venus. It had been realized, of course, that communication could not be maintained during that part of the synodic revolutions of the two planets when they were at nearly opposite sides of the sun, and the most hoped for was that we could keep in touch with the distant party during the five or six months preceding and following inferior conjunction. Our exper-

*An ostrich-like bird having six rudimentary legs, whence the name.

ience proved beyond doubt that this was possible, although, because of circumstances which I shall soon relate, we actually maintained touch with Commander Jones and his party for only thirty days. The breaking of communications at the end of that time had nothing to do with radio conditions. If there had been anyone to operate the station on Venus the signals would have been received at the Washington station.

AT the first, however, Commander Jones could send a message from Venus in confidence that it would be received about two minutes later on Earth. A program was worked out by which we made contact with the party at noon (Washington time) every day. That was merely for convenience and regularity, as there was always some one on duty in the receiving room in the commission building to receive an emergency message if there were any occasion for one.

During the first week Commander Jones daily message told a story of regular progress in establishing a home under the tropical and primitive conditions of the new world. The messages might almost have come from a party in some still uncivilized section near the equator except for references to strange plants and animals similar to those which may have existed on Earth before the dawn of human life.

The first hint of what was to come was contained in a message received on June 17. It read:

"Something has happened that we are unable to understand. Dick Smith and James Fall disappeared yesterday afternoon when they were cutting down trees a short distance from the camp, and no trace of them has been found as yet. We have dropped everything else to look for them. No one can explain what may have happened to them. We have seen vensaurians large enough to carry a man, or even two, without much difficulty, but none was seen near the time the men disappeared, and no tracks were found in the neighborhood where they were working. The large species that we have seen appear to be herbivorous and have shown no signs of attacking us. What adds to the mystery is the fact that both men were armed, and would certainly have used their pistols if attacked. No shots were heard by others working nearby. We hope that they have merely strayed away and become lost, but we do not know what to fear. I have ordered a guard on the camp at all hours. We will continue our efforts to find Smith and Fall."

This message was a private one to Dr. Sanders, and he did not make it public, since to have done so would have served no useful purpose, but would have aroused futile fears among relatives and friends not only of the two men but of all those in the party.

Subsequent messages from Commander Jones informed those of us connected with the commission that no trace of the missing men had been found. The others, after a futile search, returned to the other work which it was necessary for them to do. The camp was completed and operations were begun on the radium mine.

On July 5th we received the following message from Commander Jones:

"I am forced to the conclusion that there is some intelligent and malevolent force at work against us. What its nature may be it is impossible to say, but on no other hypothesis can I explain the invasion of our camp last night.

"There was no outcry during the night, but when we awoke this morning we found that three men who had been on guard and three other men who slept in a hut near the edge of camp had disappeared. We found no sign of bloodshed nor of a struggle of any sort, which makes the occurrence absolutely incomprehensible.

"During the morning I decided to go up a short distance in one of the space ships to survey the land, and possibly to lead the missing men back to camp if they were free. It was then we made the discovery that the ships had been entered and our tanks of fuel mixture carried away. This, apparently, had been done at the same time the men were spirited away, for I am unable to believe they took the fuel and left the camp of their own accord.

"At any rate we are now stranded here, and apparently at the mercy of unseen foes. The morale of the forty-eight men remaining in the camp is unimpaired by this latest development. We are all determined to solve the mystery and find out what happened to our comrades.

"The loss of our fuel mixture is a serious blow, since it means that we are forced to remain where we are and will be unable to do any extensive exploring unless we recover the tanks. The camp will be put on a war basis until we determine the nature of the danger which threatens us."

This message was the last that was received from the expedition.

Later that afternoon I tried to make connection with the station on Venus to transmit a message from Dr. Sanders. I was unable to obtain a reply. Nor was there any word from the expedition the following day at the usual time.

CHAPTER III.

A Desperate Plan.

SEVERAL days later Dr. Sanders sent for me to come to his office. I could tell from his nervous manner as he bade me sit down that he had something of importance to say. He began abruptly:

"We have held several meetings of the Commission," he said, "to discuss the situation regarding the expedition now on Venus. While we can only guess at what may have happened to the party, the sudden breaking of communications following the mysterious disappearance of eight of the men and the raid on the camp, indicates that some disaster has overtaken them.

"What makes the matter more serious is the loss of their fuel mixture, without which they are unable to operate the space ships. That means that they cannot move from the spot where they landed, on the northern coast of Elysia, and if they are beset by foes in overwhelming force they are unable to escape to some other part of the planet. Of course the fact that the fuel mixture was singled out for theft indicates that their foes are intelligent beings of some sort. This is in absolute contradiction to the apparently well-established fact that nothing corresponding to human life exists on Venus, but we are forced to accept the fact as it stands.

"We have decided, in short, that aid must be sent to the party and especially that we must get a supply of fuel mixture to them.

"I don't think it is possible," I protested, when he paused. "Venus is rapidly separating from the Earth at present. A space ship which started out now would have to follow the planet through its orbit and could only gain on it slowly, possibly one or two hundred thousand miles a day.* At that rate, even if the ship could carry enough liquid air and fuel mixture for the long journey, it would not overtake the planet for almost a year."

"By all the accepted standards and theories that is correct," Dr. Sanders replied. "Such an attempt would of course be foredoomed to failure. Necessity, however, is the mother of invention, and a plan has been worked out for the Commission under which we believe a space ship setting out now can reach Venus within two months. If you will consider making the trip, I will explain the idea to you. It is unnecessary for me to say that it will be hazardous in the extreme, or to point out that the lives of the 56 men who landed on Venus a month ago may be at stake. What do you say?"

"I am willing," I replied.

Dr. Sanders drew out a sheet of paper on which was drawn a system of circles and dotted lines, and which I immediately recognized as indicating the orbits of Earth and Venus around the sun. The sketch is reproduced here (Page 723) so that the reader can follow Dr. Sanders' explanation.

"The plan, as I have told you, is an extremely daring one," Dr. Sanders continued. "It is nothing less than to launch a ship into space at the proper direction and at such a speed that it will circle the sun and return in time to meet the planet Venus, in its orbit.

"The plan is shown on this diagram. The letters 'E' and 'V' show the respective positions of Earth and Venus in their or-

*The speed of Venus in its orbit is about 22 miles per second; that of the earth 18.5 miles per second. If an attempt were made to reach Venus directly, it would be like chasing after a fast-receding train.

bits at the time of the recent transit. The small circles on the orbits 'E' and 'V' show the positions in which the two planets will be on July 21, when all should be in readiness for the start of the trip."

Looking at the diagram I began to get a faint understanding of the plan, which was indeed a daring one.

"Our calculations show that in one of the small and speedy ships you would have to travel under power for about 36,000,000 miles along the course indicated," Dr. Sanders said. "Since the course lies approximately in the direction of the sun your speed would increase rapidly after you passed the point where the sun's attraction equalled the earth's. After 36,000,000 miles your speed would be such that you could shut off your power and leave the ship to sweep around the sun just as the comet does, and in the path indicated. At the end of 45 days the ship would have whipped comet-like around the sun and returned to the orbit of Venus, and the planet would have moved forward to the same point V2. Thus your trip would require less than twice the time taken by Commander Jones and his party, although you would cover almost 200,000,000 miles in reaching the planet."

"THE course lies very close to the sun," I said, after studying the diagram for a moment.

"Yes, you would pass within 20,000,000 miles of the sun," Dr. Sanders replied, "and you would feel some discomfort from the heat. Special arrangements will have to be made to protect the ship. The reason the course is laid so close to the sun is that you will gain speed that way, in addition to shortening your course. Your ship, when you turn off the power, will be a free body, exactly similar to a comet, and you know, of course, that the closer such bodies pass to the sun the greater is their speed."

I took up the diagram and studied it while I turned the proposal over in my mind. While I had no desire to sacrifice myself to no purpose, I was perfectly willing to undertake a long chance in the hope of aiding the men who were trapped on the distant planet and at the mercy of unknown enemies. On its face the plan seemed hopeless, but was it? I knew that astronomers were able to calculate with the utmost precision the course of comets which appeared suddenly in the solar system, swept around the sun and disappeared in far distances. Why, then, should they not be able to prescribe the conditions under which a body would follow a desired orbit around the sun? I knew, too, that the world's best astronomers and mathematicians were at the call of the Commission for Venus. If they authorized the attempt—

"I'll do it," I said. "You say the start can't be made until the 21st?"

"It will take that long to make the necessary alterations in the ship to be used," Dr. Sanders replied.

As he stood up and took my hand with a quick nervous motion I realized that Dr. Sanders thought my death warrant had just been signed.

"There is to be another meeting of the Commission this afternoon," he told me. "You will be present, of course, and the plans for the trip will be discussed."

CHAPTER IV.

The Trip Begins.

AHEAD of me millions of stars glittered with magnificent brilliance against the black background of limitless space. Exactly 30 degrees to the right hung the sun, a big ball of fire outlined sharply against blackness. Through the double glass port in the stern of the space ship I could see the Earth, brightly lighted by the sun, filling most of the sky behind me.

It was July 21, and my big adventure was already an hour old. After two weeks of steady work the small space ship had been remodeled to fit the special requirements of the voyage around the sun. In addition to the heating arrangement it had been equipped with a refrigerating system which would carry the intense heat from the sun-side to the off-side of the ship when I neared the sun. Special expansion plates had been inserted in the outer steel envelope of the ship to permit both extreme contraction from the cold of interstellar space and extreme expansion from the sun's heat when

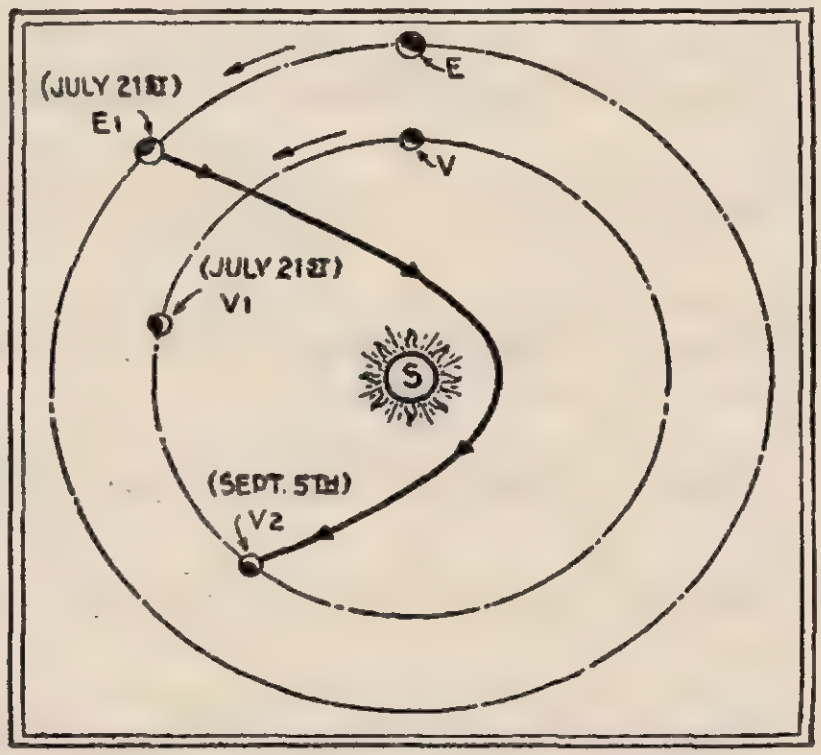
it became intense. The work had been completed on schedule, and I had stepped into the ship at the appointed hour after a final handclasp with Dr. Sanders.

My schedule permitted of no delay. Immediately after leaving the earth's atmosphere I had turned on the rocket power full force, so that I was now many thousand miles out on my long journey.

For my own use I carried twenty tanks of liquid air and five tanks of fuel mixture, enough to keep the ship going at full speed for forty days and to cover approximately 70,000,000 miles as well as supply air inside the sealed ship for sixty days. Packed away in the ship were ten extra tanks of fuel mixture for use in the big ships stranded on Venus for lack of it. I had already turned on the heating system and it was warm and comfortable in the inner shell of the vacuum ship.

With the ship set on its course and running smoothly I was able to leave the controls for the time being and watch the earth, from which I was receding at more than 20 miles a second. The earth, itself rolling along its orbit at the rate of more than 18 miles a second, had already moved a considerable distance to one side of a straight line behind the ship. In the days that followed it would steadily dwindle in apparent size until it became lost in the myriad of bright specks that surrounded me on all sides and that represented worlds and suns at incomprehensible distances.

Almost squarely abeam on the right side, and at right angles to my course, was an exceptionally bright luminary which I knew to be the planet Venus. If I could only turn and fly directly to it my journey would be a comparatively simple one, but I knew that I should require years to catch the planet if I set out to pursue it through its orbit. Long before that time my supply of liquid air would be exhausted. Instead of following what appeared to be the natural course I must trust myself to mathematical science, which declared that the sun, if permitted to exercise its influence, would whirl my ship around it in such a way as to intercept the planet at an advanced point in its orbit.



Showing the novel means used by our explorer to travel from Earth (E) to Venus (V). At the favorable time for passage the Earth should be at E and Venus at V (in a direct line with the sun). But the journey was not begun until July 21 when the planets were in the positions E1 and V1. It would not have been possible to catch Venus by chasing after her directly, so our explorer set his course as indicated by the heavy line and allowed the sun's attraction to pull him around it at a great speed and thence land him at Venus on September 5.

As far as the theory went, I was satisfied that I would reach Venus in safety. I had only to follow the course laid out for me and there was little danger of my ship missing Venus completely and hurtling far out into space to drift there long after I had suffocated for lack of air. The chief dangers that confronted me were three in number, and I was well aware of them.

The first was that I might miss my way in the maze of the heavens. Of this I was not much afraid, since I was able to check my course both by the constellations and by the sun. Even if I became hopelessly lost I might be able to reach Mercury and replenish my supply of liquid air.

The second and probably the greatest peril would be faced when my ship swept freely in its orbit close to the sun. If the cooling system failed to work properly the plates of the outer shell might be melted. This would not only disable the ship but would permit the rays of the sun to beat on the inner shell and raise the temperature to a point where human life could not exist. Here, too, however, if my equipment worked properly all would be well.

The third danger was that which every space flier encounters—the possibility of his ship being disabled by collision with a large meteoric particle. With watchfulness and care this could be avoided, despite the fact that I would have to spend some eight hourse of every day asleep. There was, of course, an almost steady succession of taps audible inside the ship as small particles ricocheted off the stream lines of the outer shell, but these offered practically no peril.

THINKING over these matters as the long journey began I felt, with the confidence of youth, that the success of my venture now depended solely upon me, and that I should prove equal to the task.

The warning bell rang, and I moved forward to the controls. An indicator, operated by a magnetic needle which reposed in a hemispherical shell of lead on the nose of the ship, showed that the meteor was approaching from above and to the left, and I quickly picked it out in that direction. It had the appearance of a star which rapidly grew in intensity. After a minute the side of it turned to the sun had assumed the appearance of a half moon toward which I was rushing with frightful velocity. The bell continued to ring at intervals of a second, growing steadily louder. I realized that the meteor was an unusually large one and stood waiting with my hand on the control, although it seemed certain, judging from the direction of the particle, that I would clear it by a comfortable margin. Alertness of vision and quickness of response in such meetings may spell the difference between safety and sudden extermination. In this case, however, the meteor was in a plane considerably above that in which I was traveling. Three minutes after the first warning I saw it flash underneath as a long streak of light. I could follow its course behind the ship for some five minutes before it became too dim to distinguish.

That danger past, I busied myself about the ship, seeing that all was functioning properly, and accustoming myself to its motion. The manifestations of gravity, as ordinarily felt on the earth, were rapidly disappearing as my distance from the earth became greater. There was no downward pull, and I was able to remain standing on the floor only because of magnetized shoe soles. Instead of a downward pull there was a steady force exerted in the ship toward the stern exactly resembling gravity and due to the fact that the ship's speed was then increasing at a steady rate under the propelling power of the rocket motor. Everything in the ship's interior was fixed in place, otherwise all would have collected in a pile in the stern. I was able to keep my place by resting my hand on a rail which ran around the interior. A strap attached to a belt around my waist could be hooked onto the rail whenever I wished.

There was, of course, no night or day on the space ship, since the sun would hang for many earth days in the same apparent position. It was necessary for me to sleep, however, and I soon found myself tired after the exertion and excitement of the start. I accordingly decided to take a nap, depending on the warning bell to notify me of the approach of any large meteoric body. I ate a capsule of food concentrate, drank a glass of water, and then lay down for my first sleep on the trip.

CHAPTER V.

Past the Sun to Venus.

ON the fifteenth day of my journey—for I had of course kept a careful record of the passage of time by earth standards—I turned off the rocket motor, leaving my ship free from then on to describe the course imposed by the sun. It will be understood, naturally, that I had power available at any moment for an emergency such as the necessity of avoiding a meteor.

The earth had long since ceased to pre-

sent more than the smallest disk to the naked eye, and was distinguishable chiefly as the brightest of the millions of stars and planets which I could see. It was located, to use a convenient nautical description off the starboard quarter of my ship, while the sun appeared off the starboard bow. At that time Venus was to be seen slightly abaft of the starboard beam, for I was now inside its orbit and actually traveling away from the planet, as I would be for many days thereafter until my ship swung around the sun and headed down the home stretch of the long trip. Venus then appeared slightly less bright than Earth.

Observations taken four days earlier, when I crossed the orbit of Venus, had showed that the ship was shooting through space at the scheduled rate. On the fifteenth day approximately one-sixth of the trip measured in distance, and one-third measured in time, had been completed. Since getting clear of Earth I had gradually altered my course nearer the sun. At the time I turned off the power the ship was rushing headlong "down hill" toward a point in the heavens about 25 degrees from the sun.

It was with a curious feeling that I threw the switch which stopped the action of the rockets. I was 36,000,000 miles from Earth, and considerably further from Venus. With the power off I had no more sense of motion than persons on earth realize their motion through space on the Earth's journey around the sun. Nevertheless I knew that my ship would continue to rush on its predetermined orbit, gathering speed steadily until it whirled like a comet around the far side of the sun and headed back to Venus. My average speed during the remainder of the trip would be double what it had been while the rockets were in operation.

With the motor turned off I could no longer detect anything resembling gravitation inside the ship. I can explain this condition best by asking my reader to imagine a closed room or box which is falling from a great height in a vacuum, and to imagine that he is sitting at a table in the room. The room will be falling perfectly freely under the influence of gravity, and its occupants, human and otherwise, will be moving under exactly the same force. Then if the man holds a book at arm's length and releases it, its position within the room will not change, since both the book and the room are falling at the same rate. In other words the book will remain suspended freely in the air of the room. The table and chair likewise may be raised and will float in the air. The man may then sit in the chair or on the table, or float about at pleasure through the room by pushing himself away from the ceiling, floor or walls He can walk with equal ease on any of the six walls of the room. This illustration is exactly analogous to the condition of my ship as it fell through interminable space on its strange journey.

The succeeding days passed monotonously, except for occasional brief periods when the alarm announced that a meteoric particle of considerable size was in the vicinity. But despite the monotony I felt a growing tension in my mind. I stood frequently at the controls watching the sun, whose size now appeared double that as seen from the Earth. The dial on my instrument board began to show that the outer starboard plates were becoming heated, and on the 23rd day out I switched on the refrigerating system which aided in carrying the heat from that side to the port side, from which it would radiate into space.

THE sun grew larger perceptibly during the next 48 hours, until I was finally able to distinguish individual tongues of flame licking out hundreds of thousands of miles from its surface. It finally appeared squarely at right angles to the direction of the ship, and I knew I had reached the most critical part of my journey, when the ship would swing around the arc of its course nearest the sun. That my cooling system was working perfectly was demonstrated by the fact that the outer plates on the sun side, while very warm, were well below any dangerous temperature.

For the next five days, from the 25th

through the 30th of the trip my ship, my ship would remain at about the same distance from the sun, speeding through the long curve around it at more than 90 miles a second, or a million miles every three hours. In the five days it would cover 40,000,000 miles.

Although this was the most critical part of the journey, and I wished to remain on guard as much of the time as possible, it was not to be expected that I could stay awake constantly for five days and keep my faculties in a proper condition to meet the emergencies that might arise. It was better to take a minimum of rest, depending on automatic signals to awaken me if any occasion arose. Accordingly after 20 hours of the critical period had passed without incident and when all appeared to be going well, I lay down for a nap. I was dangerously exhausted, and slept soundly for six hours.

When I awoke the first thing I noticed, upon looking out of the ship's ports was that the sun was no longer squarely abeam and at right angles to my course. Instead it had dropped back fully fifteen degrees. I was seriously alarmed by this observation, the significance of which will be obvious to the reader. It meant nothing less than that my ship, instead of following its plotted course, was heading away from the sun.

As quickly as possible I took observations of the apparent position of the fixed stars. This verified the fact that the ship's direction had swung away from the sun, and revealed, moreover, that the angle was slowly increasing. Calculations made from the figures I obtained showed that if the tendency continued for 36 hours the ship would be headed directly outward from the sun.

The situation appeared fraught with the greatest peril, since my ship was traveling so fast under the influence of the sun's attraction that it was practically out of control by means of the rocket motor. Moreover its action appeared totally contrary to all known laws about the movements of astronomical bodies. The only explanation I could think of was that the ship actually was traveling much faster than I had calculated—so much faster that the sun was unable to hold it, with the result that it was flying off from the sun in entirely the wrong direction. In that case I knew that the rocket motor would be able to exert only a fraction of the power necessary to right it.

The only reassuring observation that I made was one which showed that my distance from the sun had grown slightly less, rather than greater. The apparent size of the sun was larger than it had been when I went to sleep and the tongues of flame licking out from its surface were more distinct. This was in accordance with my mapped course which should have brought me at that time to about the nearest point of the course to the sun.

A moment's calm reflection gave me the answer to the strange problem, and showed that my only real danger had been that of becoming panicky and doing something which I would have been unable to undo later. The ship, in fact, was following exactly the course laid down for it, despite the fact that its nose was now pointing further and further away from the sun. What had happened was that when the ship began its curve around the sun there was no force to change the direction in which the ship *pointed*. In the Earth's atmosphere, of course, the air pressure on the stream lines would have held the nose of the ship straight. The vacuum of space offers no such resistance, and with the rockets turned off there was nothing to prevent the ship from traveling sidewise or even tail first. In fact, I saw that if left alone the ship actually would be going tail first when it reached the end of the arc around the sun and swept on toward Venus. Nor would that have mattered except for one thing—the cooling system was arranged to apply only to the right side of the ship and it would be fatal to expose the plates on the unprotected left side to the intense rays of the sun.

I accordingly turned on the rocket power slightly, and by inclining the exhaust to the starboard side, pushed the tail to the left. When the ship had assumed its correct position relative to the sun, I straight-

ened the exhaust to stabilize it on the course and then again cut off the power.

BEFORE I again lay down for a nap I had the satisfaction of seeing an exceedingly bright planet appear from behind the sun. It was Venus, which the day before had been lost to view as I swept around the far side of the sun from it. At last I was on the home stretch, and headed for my goal.

What, I wondered, had been the fortune of the party of colonists in the meantime? Had they again established wireless communication with Earth after a silence forced by some circumstances of which I could know nothing? Had the lost men returned, the tanks of fuel mixture been recovered, and would I find the camp firmly established and all going well?

Or had the mysterious raids on the camp been continued? Would I perchance find that the entire party had been wiped out and that I was the only man alive on the planet? In the latter case the chances would be heavily against my survival, although I would be forewarned of danger and on guard from the first.

These restless speculations engrossed my mind more and more during the days that followed, as the planet Venus steadily grew larger to the eye. I could tell that my ship, sweeping through space at a tremendous rate, lessening however as it receded from the sun, would almost exactly strike the planet. That was well because, although I could easily fly under power to the planet from my position inside its orbit and slightly ahead of it, I wished to save as much fuel mixture as possible. It might prove necessary to attempt to return to Earth in one of the larger ships at the next inferior conjunction and in that event the extra supply of fuel mixture which I carried would be none too much.

In the final stage of my journey the ship was traveling about at right angles to the motion of Venus, and the two bodies were converging with a tremendous mutual velocity. From an apparent size equal to that of the moon seen from Earth, the disk of Venus perceptibly enlarged. It became obvious at length that, if left to follow the orbit into which it had settled, my ship would crash into the planet—so exact had been the calculations of the astronomers of the Commission.

When still about one million miles off I turned on the power and altered my course toward a point somewhat in front of the planet. I then began reducing the speed of the ship, using the rocket power as a brake. Twelve hours later my journey was practically finished as I hovered over the northern hemisphere about a hundred miles from the surface of the planet, but well within its atmospheric shell.

CHAPTER VI.
The Raiders.

FROM a great height the continent of Elysia looked like a green carpet spotted with patches of white and brown. Below me I recognized the contours of a large peninsula which my map showed to be about 200 miles east of the mouth of the Holmes River. Before setting out for that point I dropped lower to view the surface of the planet at close range.

The green carpet was a forest of trees which I estimated to be all of 200 feet high, and it stretched inland as far as the eye could reach. Their tops were waving in a breeze hardly perceptible otherwise, and above them there was no sign of bird life or life of any sort. When I swooped down close to the water, however, I saw a group of large reptilian animals slither into a marshy backwater from the bank, where they had been sunning themselves. I mounted to an elevation of about 1,000 feet and headed westward toward the destination of my long journey. After 45 days spent alone in the small space ship I had the strongest desire to set my feet on solid ground again and to find someone of my own kind to talk to.

After half an hour, about the time I had allowed myself to cover the 200 miles, I saw that I was approaching a wide indentation in the coast line, which I judged to be the mouth of the Holmes River. Two miles upstream I should find Commander Jones' camp.

As I came nearer, however, I saw with surprise what appeared to be evidence of man's work on a bluff on the far side of the wide bay. The top of the bluff had been cleared and levelled off, and on it had been erected a dome-like mound of earth resembling a large Eskimo igloo. There was a circular opening in the top, and other openings, apparently entrances, around the circular base. The fresh dirt gave evidence that the structure, whatever it was, had been finished comparatively recently. The idea which leaped to my mind as I tried to explain this unexpected discovery was that Commander Jones had deserted his first camp for some reason and had moved to this point, two miles down, at the mouth of the river, and had erected this strange habitation. Why, then, had no one come out to welcome me?

The most logical answer was that, believing it impossible for anyone to make the trip from Earth at the time, they took me for an enemy. I hovered low and permitted my ship to drift over the mound so that if any of the party were concealed there they could recognize the ship as an Earthly one. When I came directly over the opening I could see that the mound was hollow. I could make out nothing in the dimly lighted interior, and there was still no sign of life. As I searched the strange mound with my eyes, however, I saw a pencil ray of intense light suddenly directed from somewhere within it at my ship.

Almost immediately I saw a wisp of smoke from the floor of the ship near the stern. The ray was cutting through both inner and outer plates with the ease of an acetylene torch flame eating through a thin sheet of lead.

I sprang to the throttle and advanced it. With a tremendous roar the ship leaped forward so that I was almost thrown to the floor. In barely a second I was out of sight of the mound over the trees which surrounded the cleared bluff on the land side. There I again stopped the ship, letting it drift while I examined the damage. The ray had cut a semicircular arc through the inner and outer plates of the ship, and had punctured the overhead plates as well. It had come perilously close to the reserve tanks of fuel mixture, which would have exploded and annihilated the ship if they had been exposed to it. As it was the ship had been rendered useless for interplanetary travel, although it could still be used in the atmosphere of Venus.

I had travelled some ten miles from the bluff when the ship again came to rest. After I had finished my inspection of the ship I looked about me and was surprised to notice a wide river about a mile ahead. I recalled then that I had not seen the river before. An examination of the map convinced me that in fact the bluff where the strange mound was situated was actually on the arm of a small bay, and that the Holmes River lay in front of me. I accordingly proceeded slowly to the river and turned downstream over it, since I knew I was more than two miles inland. A few minutes later I sighted a collection of huts on the right bank, and a short distance away were the two large space ships used by the Jones expedition. It was unquestionably the camp established by the party. It was overgrown with creepers, however, and gave every sign of being completely deserted. I settled down over it and saw that my judgment was correct. There was no sign of life in the camp. Carefully I brought my ship to rest near the two large space ships, and stepped out to the ground.

I was convinced that I had accidentally stumbled on the home of the creatures whose mysterious attacks had disrupted the expedition. Furthermore I had had a terrible demonstration of the power they were able to wield. I resolved that, forwarned as I was, I should not share the fate of Commander Jones and his aides, whatever it might have been. Undoubtedly the creatures would look for me at the site of the camp. As I had not seen them I could form no idea of how formidable they would be. I decided to inspect the camp hurriedly and then conceal my ship nearby and return to watch developments.

In the limited time which I allowed myself I hoped to discover some record which would indicate the fate of the colonists,

and also, if the wireless set were in order, to send a message to Earth telling of my arrival. I turned first to the semi-circular row of huts and searched them rapidly. The huts and their contents had suffered considerable damage from rain since being deserted. They still contained most of the personal effects of the colonists, indicating that the desertion of the camp had been accomplished in great haste. In the fourth hut which I entered I found evidence that it had been occupied by Commander Jones. There was a box containing some of the instruments taken from the space ships. On a shelf I found what I most wanted—the log of the trip. I opened it quickly and found, to my intense disappointment, that the last entry had been made on the day when the final message from the party was received by me in Washington. There was nothing to tell how or why the camp had been deserted, which confirmed my suspicion that the colonists had been overcome by a sudden attack directed from the mound on the coast.

I tucked the slightly mouldy book under my arm, to study it later at leisure, and completed a hasty examination of the camp. I was unable to understand the complete lack of evidence of an extensive struggle. The fact that there were no human remains anywhere in the camp permitted me to believe with some cause that the colonists were still alive. But whether they were prisoners or had been driven to some other part of the continent remained to be seen.

My search was next directed to the two large space ships. The thin waterproof cover of one of them had been torn and the ship's plates were rusting. I entered the other one and found from a cursory examination that it appeared to be in first class condition. The apparatus for compressing and liquefying air was in seemingly good repair, but the tanks of fuel mixture, without which liquid air was useless for motive purposes, were missing.

The wireless apparatus had been set up in this ship, and a rapid examination convinced me that it had not been damaged. As I was looking over it more carefully I heard a chattering sound which seemed to come from the direction of the huts. I slipped over to one of the ports on that side. What I saw took away my breath and made my heart beats cease suddenly.

A large balloon-like object, shaped like a dirigible, had settled quietly to the ground on the other side of my space ship, and from its interior were alighting several creatures whom I felt sure were from the mound colony. In general appearance they bore a remarkable resemblance to human beings, although they were unlike any men I had ever seen. They were slightly smaller than the average man, and had large heads, big round eyes which protrudede, and pointed noses and chins. They moved rapidly and alertly. They wore tunics which fell freely from their shoulders to their knees.

As I watched breathlessly, between twenty and twenty-five of these beings, presumably natives of Venus who had escaped discovery on the first exploration of the planet, alighted from the object which I could only suppose to be some sort of flying machine. Two of them immediately walked to my space ship and after examining it from the outside entered through the open passage. The others scattered to search the camp.

I realized that despite my resolutions, I had allowed myself to be outwitted by the enemy in the first encounter. The creatures had surprised me in overwhelming numbers, and in addition, as I knew, were probably better armed than I was. Knowing that they would soon search the large ships for me, I decided that the best thing to do under the circumstances was to attempt to hide in the underbrush until they had left the camp. The space ship was on the edge of the camp and I was able to keep it between me and the creatures until I reached the protection of the trees and undergrowth. I worked my way silently further into the forest and then climbed into the lower branches of a tree and mounted to where I was able to obtain a fairly unobstructed view of the camp.

A Meeting

THE Venusians, as I judged them to be, did not seem particularly perturbed

over my escape. As I watched them through the branches of the trees they concluded a search of the camp and collected around the balloon, or whatever it was, in which they had arrived. There was a conference and then several of them went to my ship and entered it. They emerged within a few minutes each carrying two of the tanks of fuel mixture. They made several more trips until all the tanks had been removed to their ship. I could see that they were preparing to leave, undoubtedly thinking that I had been rendered helpless by the loss of the fuel. I watched with the utmost interest as they entered their conveyance. A cleverly constructed door closed downward, apparently sealing the ship airtight. Then without a sound and with no means of propulsion which I could observe, the object rose in the air and headed purposefully in the direction of the mound.

I descended the tree and made my way back toward the camp. At the fringe of the underbrush as I was about to step into the cleared space I heard a rustling sound nearby to the right. I dropped to the ground, although the noise had come from so near I was almost sure I had been observed. My fears turned to amazed joy when I looked up and saw a man step from behind a tree a few yards away. It was Captain Matthew Eddy!

"Starrett!" he cried. "But how on earth —"

Captain Eddy's joy and surprise at this unexpected meeting equalled mine. He was at first unable to believe my story of the trip around the sun, but my presence and that of the small ship forced him to accept it. He then told me briefly the history of the expedition in the following words:

"You already know of the disappearance of Smith and Fall, and later of six other members of the party, and of the theft of our fuel mixture. We were totally at a loss to explain these mysteries, especially as we had every reason to believe that there were on Venus no other intelligent beings than ourselves.

"On the night following the first invasion of the camp I was awakened by a cry from the adjoining hut. As I started up I saw two man-like creatures framed in the doorway. They immediately pounced upon me and before I was really awake they had overpowered and bound me. I was left alone in the hut for about five minutes, and in that time I managed to slip the knot in the wiry cord which held my arms and free myself. I realized from the sounds I heard that the camp had been invaded in force and that all the men probably had been made prisoners as I had. Knowing that the fate of the entire party might depend upon me I crept cautiously to the door and looked out. There were about a hundred of the strange men in sight, many of them gathered around what resembled a dirigible which rested in the camp. Others were carrying the bound forms of my comrades and placing them in the object—*which I have reason to believe is nothing less than a space ship.*

"It was obvious that if I showed myself I would immediately be overpowered and captured. The lives of my comrades appeared to be in no immediate danger and I decided that my best chance of rescuing them lay in maintaining my own freedom and watching developments. Accordingly I made a hole in the rear of the hut, and, unobserved, slipped out of the camp. I was the only one who escaped the raid. The others were all placed, securely bound, in the raiders' ship. Ten minutes later I saw the ship rise silently until it was outlined against the stars high overhead. It then headed swiftly in a northeasterly direction."

Captain Eddy told me briefly how he had set out immediately in the direction taken by the raiding party, and after a week's search had found the mound colony. He had stayed in the neighborhood of the mound ever since, except for an occasional trip through the ten miles of jungle back to the camp for supplies. He had observed the actions of the mound men from trees on the fringe of the cleared bluff, but had seen no trace of the prisoners. His observations had convinced him, for one thing, that the dirigible used by the mound men was really a space ship of some strange kind.

"I have come to the conclusion," he said,

"that the mound creatures are not natives of this planet any more than we are. They are totally unlike any other form of life to be found on Venus, and it is almost inconceivable that they have developed here so tremendously in advance of everything else on the planet. It would be no more incongruous to imagine modern men living in the same world with the prehistoric animals which roamed over Earth when it was comparatively young.

"Moreover the fact that there is only a single colony and that the party has a space ship is almost conclusive evidence that they are visitors from another planet. It is my opinion that the party came here from Mars, where, we have reason to believe, there is life similar to that on Earth."

The force of what my companion said was apparent, and I was inclined to share his view. If it were the truth, we were undoubtedly faced by the strangest situation any man had encountered. Nevertheless, that view of the situation held more hope than any other I could imagine. If the mound creatures were indeed Martians then their number was limited. If Captain Eddy and I could outwit them—find some means of freeing our comrades—the struggle for control of the planet should not be too unequal, although I was sure the mound creatures—whether Martians or natives of Venus—would prove worthy opponents. My companion told me that there were about 150 of them living in an excavation in the bluff, to which the openings in the mound were entrances. About half of them went daily in the space ship to some point west of the Holmes River, he said. As he had no way of crossing the river he had been unable to discover the objects of these trips.

Captain Eddy told me that he had made an attempt to operate the wireless set but that his knowledge of radio was not sufficient to enable him to succeed. Together we slipped into the space ship and I began working on the set.

I found that the batteries had lost some of their strength, but nevertheless I made the necessary adjustments, and began flashing the earth call at five minute intervals. Several hours later, when I was about to give up in despair, I caught an answer. I then transmitted a brief but thorough account of the supposed fate of the party of colonists, with the assurance that Captain Eddy and I would do all possible to rescue them if they proved to be prisoners of the mound men.

CHAPTER VII.
Trapped.

AT Captain Eddy's suggestion we spent the night in a tree near the camp, sleeping on a platform of boards taken from one of the huts. At dawn we ate breakkfast in the camp and then set out for the coast, working our way through the light underbrush. Although the going was not difficult it was necessarily slow, and the sun indicated it was noon when we finally approached the bluff on which the mound was located. We were aided by the fact that the force of gravity on Venus is almost a fifth less than on Earth, so that while we retained our strength on Venus we lost about one fifth of our weight. Consequently we were able to walk much more lightly and to leap over obstacles which, on Earth, we would have had to climb painfully. Moreover the weight of other objects was similarly reduced, so that 120 pounds could be lifted with the same effort that would be required to raise 100 pounds on Earth.

We lunched on the sap of a milk tree in which my companion had set a spigot. The fluid tasted considerably like milk and Captain Eddy told me that Dr. Alexander, the chemist of the expedition, had found it particularly nourishing. The trees were plentiful along the coast, growing to a height of about 20 feet under the shelter of the tall trees.

We then approached cautiously nearer the bluff and climbed into a tree which my companion had found well suited for observation. The space ship was not in sight, having gone as usual somewhere to the westward. Nor were any of the mound men visible at the time. Five minutes later, however, we saw ten of the creatures emerge from one of the openings at the base of the mound. They descended the bluff and

disappeared in the forest to the left.

I suggested, imprudently enough, that Captain Eddy remain where he was while I made an attempt to cross the bluff and enter the mound, in the hope of reaching the prisoners and freeing them. Captain Eddy emphatically vetoed the plan, telling me that the top of the bluff was constantly watched. He then outlined his own plan of action, which required that we remain where we were until after dark, when one of us could try to penetrate the home of the mound creatures. Captain Eddy had often wished, during the two months he had watched the mound, that he were free to make a similar attempt. The odds against success were so great, however, and his responsibility as the only free colonist was so great that he had not risked it. Now that there were two of us he agreed with me that the effort must be made. At my insistence he agreed that I make the attempt, while he remained in the forest.

As we were discussing this plan in whispers I realized suddenly that the tree in which we were concealed was swinging slowly out of its vertical position. Startled, I looked down and saw, far below me, at the base of the tree, a pencil ray of light eating through the trunk. The swing toward the ground continued with increasing momentum and in a second the tall tree was crashing through the branches of its neighbors, while Captain Eddy and I were scratched and buffetted and finally torn loose from the branches to which we were clinging. The resistance of the other trees slowed our fall somewhat, but I was thrown clear of the tree when it finally crashed through, and struck the ground with sufficient force to stun me momentarily.

Before I could move two of the strange men from the mound pounced on me like cats and pinioned my arms. I struggled as well as my returning strength permitted and for a half-second flung them free. The next instant they were back, and several others dashed in to aid them. After a fierce but brief struggle one of them slipped a noose over me and drew it tight about my arms. I was rendered helpless and, though I continued to kick and writhe as long as possible, they quickly completed the work of trussing me securely. When I finally relaxed, realizing the futility of further struggling, I was laid on the ground. A minute later the bound form of Captain Eddy was placed beside me. I saw that he was unconscious, and that his forehead was bleeding, but I could not tell how badly he was hurt.

Our captors, who were the same ten we had seen leave the mound, chattered briefly among themselves, and then Captain Eddy and I were picked up and carried up the bluff and into the mound. After carrying us through a short passage from the entrance our captors descended a long flight of steps cut in the dirt. The lower level was lighted with a soft pleasant glow the source of which I could not determine. A large central arena was revealed, with cells around the walls and with six passageways running off at intervals of sixty degrees. We were transported down one of these passages for about fifty feet—half of its length—and the party halted in front of a door. One of the mound men turned several levers, and then swung the door open, revealing a vestibule about ten feet wide and fifteen feet long, with a closed door at the far end.

WE were laid on the ground in the center of the vestibule and the mound men departed, closing the door through which they had carried us. Some thirty seconds elapsed and then there was a sharp click. Immediately the inner door opened and Commander Jones and several others of the missing colonists appeared. They did not seem particularly surprised to see the form of Captain Eddy, but their amazement when I was recognized can be better imagined than described. Our mutual exclamations were interrupted after a moment by a low musical note from the inner room. Apparently it was a warning.

"Quick!" Commander Jones ordered in a sharp voice; "Drag them in!"

Friendly hands grabbed me and dragged me, still bound, through the open door. Others carried the still unconscious Captain Eddy into the large room which was

revealed, and the door then snapped shut.

Commander Jones turned his attention to Captain Eddy, while others quickly unbound me. My companion had suffered a bad cut on the back of his head. He revived as his head was being bathed with water taken from a small channel which led through the underground chamber, and it was found that his wound, while painful, was not serious.

Commander Jones then listened with the utmost interest to a recital of my trip from Earth.

"We heard something of your arrival from our jailors," he said, surprisingly, "but it seemed so incredible that we decided there was some mistake. As for poor Eddy, we have had regular reports of his activities. While he thought he was unobserved he has been under constant surveillance and could have been captured at any time during the two months we have been held here."

"Do you mean that you can communicate with your jailors?" I asked, "And for that matter, who and what are they?"

"I can tell you everything that we know about them very quickly," Commander Jones said.

"Soon after we were made prisoners I was taken into an office in another part of this ant hill. There was a recognizable map of the heavens on a table. One of our captors who acted as spokesman indicated Earth on the map and pointed to me. I nodded my head, foolishly thinking that he would understand that affirmative sign. When he failed to do so I touched my chest with my finger and then placed the finger on the dot indicating Earth. This he understood, and in a like manner he told me that he and his companions came from Mars.

"He then touched himself and indicated his companions. Placing his finger on Mars he traced a path to Venus. Then he nodded his head vigorously. I was forced to laugh, as you would laugh at a monkey, by the celerity with which he had adopted my sign of affirmation once he understood it. I realized, however, that he was no monkey, but a being of quick intelligence. But his message was not completed. He next indicated Earth on the map and traced a path to Venus, and then made a sign of breaking something in his hands. The meaning was plain enough. He was telling me that Venus should belong to the men of Mars and not to the men of Earth. My reply was to show my defiance in the same manner he had adopted.

"Since that day I have had many conferences with the same individual and we have developed a means of communicating ideas with a minimum of effort. I have picked up some of their vocal sounds and he has learned a remarkable amount of something approximating English. Although there is a certain amount of friendliness between us because of this ability to understand one another, his enmity as a Martian against all Earth men, and his determination to keep Venus for his own race is unaffected.

"The present expedition of Martians numbers about 200 and they have been on Venus for more than two years. During that time they have not been able to communicate with Mars. I was surprised that they had not developed wireless until I learned that they have the ability of transmitting thought very efficiently. This, of course, made wireless unnecessary on their home planet, but it cannot be used for more than a few thousand miles.

"As a result of this the party must return to Mars to report the success of their trip and their discoveries here. They are planning to leave within a few weeks, when the position of Mars will be favorable. Then at the next favorable conjunction they plan to return with other ships and several thousand of their fellows. They expect that ten years from now the entire population of Mars will have been transferred to Venus, since Mars is rapidly becoming incapable of supporting life. The population of that planet now is only about a million, as nearly as I can make out.

"One thing they have given me to understand very definitely. Before they leave Venus they plan to kill all of our party, not out of any feeling of enmity, but solely to eliminate the possibility that we will return to Earth for reinforcements and will

contest with them the possession of Venus. The idea has never occurred to them that the men on Earth already know of the success of our trip and the nature of conditions on Venus."

"BUT can't we do anything?" I protested.

"We have not been inactive," Commander Jones replied, "and we have high hopes of escaping and outwitting them. I must explain to you first the nature of our prison.

"The walls are charged with an electric current at high tension and it is only necessary to press on them to receive a very severe shock. Since the connections are behind the walls we are unable to get at them, and it would do no good if we could, because they would know it immediately if the current were interrupted. They have a special connection by which they can permit us to go into the vestibule to get food they have left there, but if we linger the current is switched on. Our water we get from the stream running through the end of the room. It drops to a lower level near the wall, you see, and serves there to dispose of waste. It is the system of plumbing which they have provided for the entire colony."

He led me over to the wall beyond the small stream and raised a box which rested there. Under it was a hole about three feet across leading down into the ground.

"Soon after we were imprisoned here we began working on a tunnel under the walls, disposing of the dirt in small quantities by letting the stream carry it out to the ocean. It is now completed to within a foot of the surface near the base of the bluff on the land side, and we are only waiting the propitious moment to put out escape to the test."

Commander Jones next led me to the double row of bunks in the center of the room. Under the foot of one of the bunks he pointed out two containers which I recognized as cans of fuel mixture.

"I found out where these were kept," he explained, "when my Martian captor questioned me about them. These two are all I have been able to slip in here unobserved on my various trips into the other parts of the ant hill. They will serve our purpose, I think."

While others of our fellow prisoners gathered around us Commander Jones explained to me the plan that had been worked out. The tunnel could be forced through at the base of the bluff at any time by a few minutes' work. Our leader thought it best to wait for a few days, until the exact plans of the Martians were revealed, and make the break for liberty at the last moment consistent with safety. Two of the men would slip out under cover of darkness, carrying the two tanks of fuel mixture with them, and make their way to the abandoned camp where the two large space ships and my small one were deserted.

A highly explosive bomb could be made by injecting a small amount of the fuel mixture into one of the heavy tanks of liquid air. Using the rest of the fuel mixture to operate one of the ships, the pair would return over the mound and drop the bomb on it. The attack on the mound would be timed exactly, and before it was made the remaining prisoners would slip out through the tunnel and escape to a safe distance from the bluff.

There was a large group of the colonists who chafed at the proposed delay in action. It was their argument that the Martians might at any time decide to carry out their announced plan of doing away with all of us. It was argued that their capture of Captain Eddy and me, putting all of the Earth men on Venus in their power, indicated that the crisis was near. At any moment they might introduce into the underground chamber a poisonous gas which would give us no chance of resistance, or of using the tunnel.

This faction proved the more weighty, and when Commander Jones acceded to the wishes of the majority it was decided that the attempt should be made that night. Commander Jones refused to leave what he considered the position of greatest danger, nor did Captain Eddy's condition permit him to indulge in anything so strenuous as a ten-mile trip through the forest. Commander Jones accordingly appointed Arthur Rhodes, one of the most resourceful mem-

bers of the party, as one of the pair to make the attempt to bomb the mound. I was picked as his companion because of my familiarity with the operation of both the small and the large space ships.

About an hour before dawn the following morning Rhodes slipped headfirst into the hole in the floor and wriggled out of sight. I followed, although the dark hole was anything but inviting. I made my way through the tunnel more slowly than my companion, pushing the two containers of fuel mixture before me. When I finally touched his foot with my outstretched hand he whispered to me to lie quietly for a momen. He had already removed some of the dirt at the end of the passage. After a moment, when no sound reached us, he resumed work, passing back handfuls of dirt to me, which I distributed on the floor. After a few moments I felt him slip forward and then felt a breath of cool air. I silently wriggled forward and slid out of the end of the tunnel. We placed a piece of brush over the opening and then slipped into the forest carrying our burden, apparently unobserved.

We proceeded slowly until sunrise, after which we were able to make better time. Considerably before noon we came to the river bank and soon located the camp. We had decided to use one of the large ships, since they were equipped with chambers in the floor through which the bomb could be dropped. We accordingly set to work at once dismantling the aerial posts from the ship which was in the better condition of the two. That completed we entered the ship and continued our preparations, arranging the powerful bomb and fixing a fuse to it.

All was in readiness long before night, but we were forced to wait until the prearranged hour to give our companions an opportunity to escape from their prison.

CHAPTER VIII.

The Battle in Space.

AN hour after sunset we closed the door of the big ship. I loosed the rocket power and the ship rose swiftly to a height of several hundred feet, where I steadied it. As it would take no more than a few minutes to arrive over the mound colony, Arthur Rhodes was already stationed at the center of the ship, where the improvised bomb lay in the chamber in readiness to be dropped. His voice came to me over the telephone.

"O. K. Let 'er go!"

I turned in the direction of the mound and picked up a speed of about 200 miles an hour. I did not wish to go too fast as it would be necessary to slow down over the bluff on the sea coast so that my companion could drop the bomb accurately. He would have enough difficulty in any event in aiming the missile through the glass port in the floor. Even so, we were in sight of the mound in four minutes.

As I reduced the speed of the ship I saw a dark object rise swiftly over the mound. There was no sound, but in the dusk I could make out the outlines of the Martian space dirigible, which was shooting upward with increasing speed.

It seemed obvious that the Martians had discovered the escape of their prisoners, and had acted so quickly as to entirely upset our plan. How many of the party were in the big ship I could only guess, but it seemed best to carry out the plan of destroying the mound, where I presumed the majority of them remained. I accordingly held the ship on its course. When almost directly over the bluff I saw a figure run out on it with a blazing torch. By the indistinct light I realized that it was one of our own party. Lest Rhodes should fail to recognize him and drop the bomb, I swerved seaward quickly to prevent the ship from passing over the bluff.

As I did so I suddenly understood the significance of the signal some member of our party had risked his life to give. For some reason, at which I could only guess, the Martians had entirely deserted the mound. All of them, then, must be in the space ship. Could it be that they were departing for the long homeward journey? Had they discovered the escape of all their prisoners and started to search for us at the deserted camp, only to change their plans

when our ship came in sight as they took off?

These conjectures flashed through my mind instantaneously. I automatically turned the ship upward and advanced it to high speed in pursuit of the Martian ship. As I did so, the voice of Rhodes came to me from the center of the ship. He had not seen the Martian ship, and was unable to understand what had occurred. Receiving only disjointed exclamations in answer, since all my attention was devoted to the pursuit, he came forward to where I stood in the bow of the ship. By that time I had collected my ideas and was able to tell him in a few words, what apparently had occurred. The Martian ship had disappeared from our sight, but from its course while it was visible I judged that it was still mounting upward from the surface of the planet.

Rhodes agreed with me that we should attempt to overtake the Martian ship and disable it, if possible, rather than permit its occupants to reach Mars and return with reinforcements. We had seen that the Martians were intelligent and resourceful, able to use weapons which gave them a decided advantage over us, and absolutely ruthless in their determination to hold Venus for their race and to wipe out all competitors. They had openly declared themselves our enemies, and we were forced to regard them as such.

Although the sun had set an hour earlier on the surface, our swift flight upward brought into view first a reddish glow in the west, and then the rim of the sun itself appeared. Strain our eyes as we might we were unable to see the Martian ship.

I pushed the space ship to the limit, increasing its speed steadily as the atmosphere became less dense. We shot swiftly through the upper layers of atmosphere and soon emerged into the blackness of interplanetary space.

"There it is!" Rhodes cried.

I looked in the direction he indicated and saw a thin crescent of light overhead and to the left. It was undoubtedly the Martian space ship, shining moon-like by the light of the sun. Against the completely black background of limitless space it was impossible not to see it. Could we overtake it?

I COULD hardly doubt that we had been observed by the Martians as soon as we emerged from the atmosphere of Venus, but I decide upon a ruse. If I could place our ship directly between the Martian and the Sun we would be invisible to them, while their ship could be seen in its largest and brightest form. I accordingly cut to the left and in five minutes accomplished my purpose. Although we had lost valuable distance in the race to overtake the Martians, we now had a distinct advantage in being visible to them, if at all, only as a small speck on the disk of the sun, while their ship shone like a large moon before us. The question now was one of speed.

We had about a day's supply of fuel mixture. However, since our ship was not designed for space combat our only way of disabling the enemy ship was to drop the improvised bomb on it. I realized, of course, that this could not be done except under some gravitational force. If attempted outside of a fairly strong gravitational field the bomb would not "drop" but would continue to travel with our ship until it exploded and destroyed us. The only chance of success, a slim one at best, was to make the attack while still within the gravitational field of Venus. I accordingly pushed the ship to the utmost, and had the satisfaction of seeing the Martian ship grow larger in appearance, showing that we were overtaking it.

While the description of these events has taken considerable time, the reader must understand that their actual occurrence covered only a brief span. We were already, however, some 10,000 miles from the surface of Venus and it was apparent that we would be 15,000 miles up before we could overtake the fleeing ship. I made a rapid calculation in my head. The attraction of gravity at the surface of Venus is about 26 feet a second. At 15,000 miles the acceleration would be less than two feet a second. However that would suffice if my plans worked out otherwise.

Rhodes fell in with the idea completely when I sketched it in a few words.

"I'll put a ten-second fuse in the bomb and let you know the moment I release it," he said.

Left alone in the control chamber in the bow as my companion hurried back amidship, I watched the Martian ship grow steadily brighter. I wondered if the enemy ship, like ours, was entirely unfitted for fighting. If they were able to direct that powerful ray of light from the ship we were doomed, for once the double shell of our ship was punctured we could not survive in the vacuum of space. That was a chance we were forced to take.

It was only a few minutes before our ship was quite close to the Martian. The superior speed at my command enabled me to manoeuvre the enemy into position between our ship and the planet below. I then let the space ship sink gradually until it was speeding along a course directly parallel to that of the Martian, exactly above it relative to Venus, and separated by no more than fifteen or twenty feet.

"All set?" came the steady voice of Arthur Rhodes.

"All set," I replied.

In my mind's eye I could see him light the fuse, close the inner door of the chamber and open the outer one.

"It's off!" came his shout over the telephone.

I held the ship steady for two nerve-wracking seconds to give the bomb time to clear it, and then again turned the rockets on full force and directed the ship sharply upward.

With the nose of the ship pointed away from the Martian ship, I was unable to see what happened next, but when I turned some ten seconds later at a distance of more than a hundred miles from the point where the other ship should be, it could not be distinguished. Instead, I could make out several large luminous particles, and I knew that innumerable smaller particles of what had been the Martian ship had been flung off in every direction.

Arthur Rhodes, who joined me in the control room, had actually witnessed the break-up of the Martian ship. No noise of the explosion had reached us, of course, since sound is not carried through a vacuum.

The large pieces of the ill-fated ship had been flung down toward Venus in different directions. Soon after our ship reentered the atmosphere of the planet we saw one of these particles flash through the atmosphere as a flaming meteor or "shooting star."

It is necessary only to add that Rhodes and I joined the other colonists and that the interrupted work begun on the radium field was resumed. A few days later we discovered what had taken the Martians daily to the westward of the Holmes River. Several miles west, on another seacoast bluff, they had built another colony such as the one which Commander Jones called an "ant hill." Doubtless this had been intended as a home for others who were to be led back to Venus by the exploring party. However, the Martians apparently deserted the plan of colonizing Venus when the party of explorers failed to return, and none of them have since appeared on Venus. The Earth colony there has of course grown to important proportions and the inspired dreams of Dr. Sanders, head of the Commission for Venus, bids fair to be not only fulfilled, but surpassed.

THE END.

For Wonder Stories

"Next Month"

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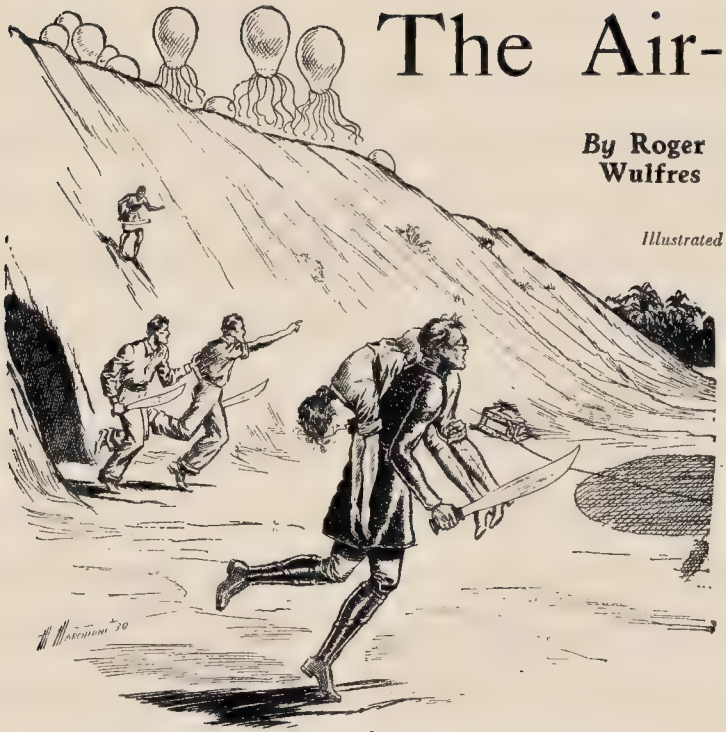
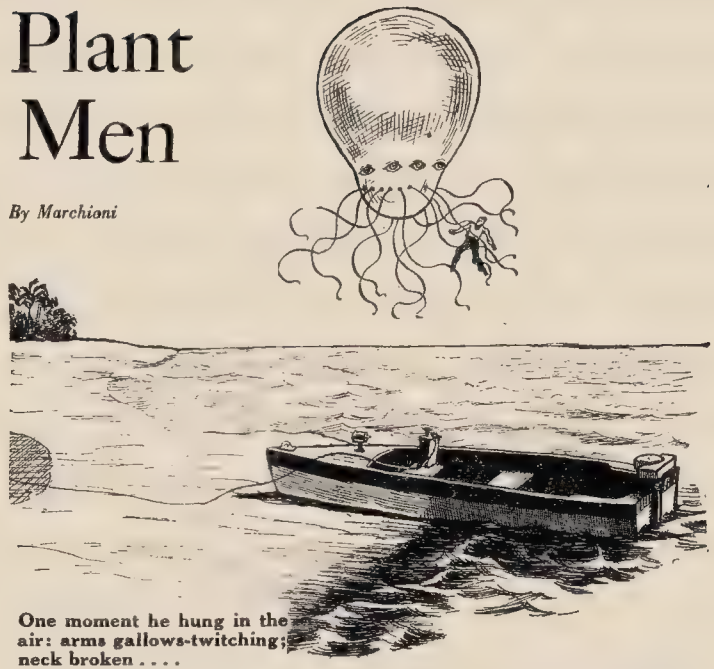
The Air-Plant Men

By **Roger Wulfres**

Illustrated By Marchioni





One moment he hung in the air: arms gallows-twitching; neck broken . . . .

As the 'Death Lily' Began to Appear on Earth—in Remote Places the Air-Plant Men Prepared . . . .

A FAMILIAR shadow was cast upon the frosted glass of the door-panel. A sturdy fist hammered out a well remembered *rap-a-taptap.*

"Come right in, Doctor," I cried, as I pressed the button which released the electrically controlled door-catch. "This is certainly a surprise."

Doctor Destanne swung the door open and entered. It was good to see the little biologist once more. Sibyl, my fiancée, had been acting as his assistant for several months. During this time they had been cruising in the West Indies hoping to complete their extensive research into certain obscure plant forms of that region. Destanne had now returned, weeks in advance of their schedule; which meant that Sibyl must be in the offing.

But Doctor Destanne was unaccompanied, although he turned and closed the door behind him so swiftly that his action suggested pursuit. Yet it was not the manner of his entry that startled me; it was his attire that made me stare.

He was wearing a light-weight grey overcoat buttoned well up around his throat, a tweed cap, and a heavy pair of monstrous goggles that were so large they resembled an owlish mask. A truly amazing outfit for a midsummer day in New York City.

Without a word he hurriedly crossed the room and closed the windows that overlooked a sea of roofs. When he removed his goggles from a face that was streaming with perspiration and sank with a gasp into the large, leather upholstered office chair I keep in readiness for clients, I saw that he was on the verge of collapsing.

"Whew!" he said at last. And I saw that his face, usually so placid with a professional calm, was haggard from sheer exhaustion. "Thought I'd never make it."

I filled a tumbler with ice-water from the cooler. Doctor Destanne took the brimming glass from my hand and swallowed the contents at a gulp. "Whew!" he said again.

Never in all my long friendship with the staid little man had I seen him anything like this. Usually, he made me think of a prosaic, busy little brown sparrow.

True, there was the time when he returned from crossing and recrossing that deadly valley of gigantic arum lilies west of Zanzibar. That must have taken nerve. Only after his reports were completed had the public learned that the perfume of those tremendous blossoms—large as elephants' ears—had overpowered the pilot while Doctor Destanne was photographing the valley at two thousand feet. They would have plunged to their deaths, stifled by the lethal fragrance, but for Destanne's hair-trigger nerve.

"It's this accursed thing that's such an abomination," he was saying, when I returned with more ice water.

HE had unbuttoned his overcoat and now I saw what had been concealed beneath it.

Surrounding his throat was a massive metal collar which completely covered his neck. Connected to the lower edge of this strange collar, finely interlocked metal links glittered.

"Chain mesh—from there on down to my knees," he said. "Steel," he added significantly.

"Yes, but why?" I burst out. "Surely you aren't being hunted by gunmen."

"Worse than that, Roger. Much worse. Have you anything to smoke here?"

I drew an open box of Havanas from the desk and pushed them toward him. He had calmed sufficiently to recover his clipped, precise speech, but I saw that he was still far from his usual meticulous self.

"Worse," he mused as he got the cigar burning evenly. "Worse. It's damnable." He paused, inhaling deeply, as if pondering a diagnosis. Then, tossing precision aside with a gesture, he flung his words to the wind.

"I came to you, Roger, for help, because I knew I'd get it. We haven't time to go into all the details now. If we hurry we can taxi out in time to catch the 9.30 Seaboard Airliner south. Talk over the problem on our way. It's devilishly complicated. As terrible a doom as ever threatened an unsuspecting world — the air-plant men. They followed me here. Nothing I can say will stir our slow-moving national defense organization into action in time to avert a disaster. Our country—even Sibyl's existence—is hanging by a thread, a tentacle."

He stopped suddenly and I seized him by both shoulders. "Sibyl?" I breathed.

"As if we needed concrete evidence," Destanne said, pointing to the window where evening shadows were fast gathering.

I would have stepped forward, but he intercepted me. "Back," he shouted. "As you value your life, leave that window securely fastened."

Then I saw what appeared to be a length of dangling cable, coarse stuff, that was swinging freely a few feet beyond the parapet. Perhaps as heavy as a man's finger, medium-sized, brown hempen cable, I thought.

"Workmen," I said aloud.

But even as I spoke the cable twisted with an uncanny waving motion. Another length descended and hung a foot or so from the first. Then another, and another, until there were fully a dozen of them dangling and swinging, but ever gliding downward.

Curiosity prompted me to crouch and watch the upper edge of the window. I caught a glimpse of some vague grayish bulk that was hanging there; then the mass sailed swiftly down to stop abruptly, hovering directly outside the window.

Destanne coughed slightly. "One of the scouts," he said, with the manner of a curator explaining an interesting specimen. "He doesn't want to lose track of me. From now on, Roger, I'd advise you to be prepared for anything."

Like one hypnotised, I crouched staring

WE are accustomed to thinking of sentient beings in terms of human or other animal life. We cannot conceive, for example, of a plant having "a brain." Yet the functions that many plants perform are in reality no less complicated than our own actions, and if the ability to adapt oneself to circumstances is intelligence, we must admit this quality in many plants. Sir Jagadis Bose, one of the noted paleontologists of the world, comes to this conclusion in his remarkable book, "Plant Autographs and Their Revelations."

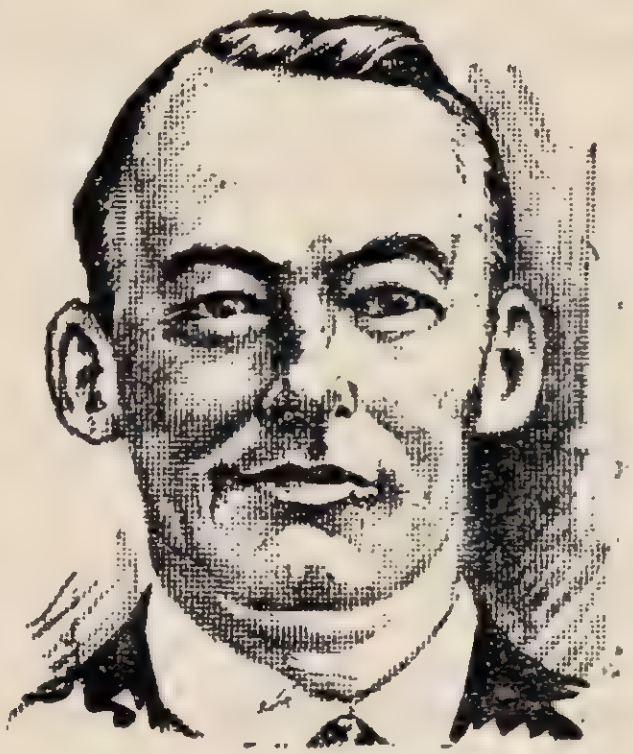
It is not far-fetched, then, to give to plants a will to have control over the earth and displace men. What prohibits them from any such action is that they are fixed in place for their entire lives. But suppose there arose a plant that was not fixed but could "feed" wherever it wished. Then, endowed with mobility, such a sentient plant, would indeed be a menace to our race, as our author shows in this thrilling story.

at the creature that faced me beyond that expanse of thin window-glass.

Nine eyes in a horizontal row, black orbed, blinking, strangely human eyes with human intelligence and human curiosity shining in the sparkling depths. The row, so compact was it, did not exceed two feet from end to end.

It was moving. The eye at the left-hand end of the row closed and sank away. The row moved along from right to left, a tenth eye became apparent at its right-hand end. Another eye blinked and drifted away. Again the row moved along, again and again.

I felt I was being inspected by a concentrated nightmarish crowd of people. It was a moment before the shock of the thing wore off. But soon I was able to reason sufficiently to understand that the eyes were placed at regular intervals around what appeared to be the neck of a balloon-shaped affair. And that this balloon-like creature was slowly revolving horizontally, so that each of its many eyes was being presented in slow succession.



ROGER WULFRES

For awhile I suffered the inquisition of the baleful creature's penetrating stare. Then, so suddenly that it gave the impression of an optical illusion, the thing was gone and the shadows lay long and soft over the adjacent roofs, and the flickering fireflies that were the traffic glittered in the deeper canyons beneath us.

"That's that," Destanne said with forced flippancy. "Up to the five thousand foot level like a shot and practically out of sight from the ground. Now you will understand why I'm wearing this accursed collar, Roger, They wouldn't dare attack us in a crowd, not at this stage of the game, at least; but when they do get a chance those tentacles of theirs are almost as tough as steel—elastic as rubber bands, sensitive as fingers. Directed by a fiendish intelligence, they choke their victims, gouge out his eyes—"

"And Sibyl—is being held by these—these infernal creatures?" I gasped. My voice sounded hollow and I wondered vaguely if I could be talking in a dream.

"She is," replied Destanne brusquely. "If you'll grab your hat, I think we might make a dash for a taxi right now and, with luck, be in time when we reach the airdrome to catch the 9.30."

CHAPTER II.

The Trail of the Death Lily

TOGETHER we shot down to the ground floor of the Fanton Building in an express elevator and darted across the pavement into a waiting taxicab.

Once inside the cab, Doctor Destanne gave the chauffeur terse instructions to take us to the Seaboard Central. Then he closed the window and removed his goggles.

"Be surprised how quickly those things can get you," he commented, pointing upwards.

"We're going empty handed," I reminded him.

"No. I ordered quite a lot of stuff in Miami on my way north. A radio from the flying field will have it meet us when we pass there. Lot of things, including a collar and chain-mesh for you, and goggles. And one of these—"

From just above his belt he seized the scarcely concealed hilt of a machete; jerked the weapon out and stroked its razor-keen edge as lovingly as a Roman gladiator might have toyed with a short sword. I was glad when he slammed the frightful blade back into its scabbard, for the chauffeur had been watching us suspiciously.

We reached the flying field without interference and more than half an hour before the time set for the great amphibian airliner's departure. Here I found the Doctor's

arrival had been expected and arrangements had already been made for our passage. A sheaf of telegrams settled my affairs and I was ready to join Destanne in one corner of the luxurious smoking compartment of the waiting ship.

"Sibyl," he said, apparently reading my thoughts "is in the gravest danger, in deadly peril, in fact; but not in altogether imminent danger. That is, I suspect we shall be in ample time if nothing unforeseen occurs.

"You will appreciate the situation better if I begin somewhere near the beginning and give you an outline of what I know of the air-plant men.

"Brisson, a New Orleans police detective, who is also a brilliant Southern botanist, sent me in a joking way a specimen of a tiny and quite rare plant—er, not unlike a hyacinth. He wrote me that his confrères had given this plant the name of 'Death Lily' for a rather curious reason.

"Brisson, it seems, had been at work assembling the data on all the recent murders in the South, especially Florida and Louisiana. They had a string of eight apparently unreasonable, disconnected, uninteresting homicides—unsolved affairs of violence. They were alike, seemingly, in only one respect. Fiendish brutality. Crushed skulls, broken necks, gouged out eyes. In one case, the victim had been practically torn asunder.

"All of them were country people, obscure tenant-farmers or farm laborers of the very poorest class and utterly without money or enemies. The cases were so far apart, however, and the time interval between so short, that not even a fiend killer seemed to fill the bill.

"Brisson's love of botany often led him far afield. In his investigation he found a bed of the tiny hyacinth, a specimen of which he sent me, growing somewhere in the vicinity of *each murder*. 'Death Lily' they named it."

DESTANNE paused and gazed thoughtfully at the airdrome beacon, a restless finger of light which stroked the night sky that lay beyond the smoking-room's heavy curved-glass windows.

"Death Lily" he said again. "Brisson's associates had named it well. A modest, pale-blue bloom with a peculiarly pleasant, sweetish aroma—harmless, fragile, non-poisonous, shrinking as a violet yet more deadly in its significance than the vilest leper.

"We traced it, Sibyl and I, to what seemed its source—this 'Death Lily'—for it was a newcomer to the South. The beds Brisson found were undoubtedly far-flung colonies of a plant apparently having its origin on a group of uncultivated, tropical islands lying in the Caribbean south-east of Cuba. 'Shadow Island', the map called the largest one. The lines we plotted on our charts converged at that point.

"At this time we haw no thought but for the fun we were having assembling data on an unknown plant recently finding root in North American soil—a seemingly harmless and rather likeable plant at that.

"To test our figures, we decided on a trip to 'Shadow Island'. That was when we left New York, as you remember."

I nodded. "And at 'Shadow Island' you found what?" I asked, rather tired of the details.

"At 'Shadow Island'," Destanne bit out grimly, "we found Hell."

The great airliner was already shaking with the pulsations of its powerful engines. A last passenger arrived followed by a white-coated steward. The roaring of the engines rapidly grew in intensity; soon we would be taking off and anything resembling conversation would be drowned out by the ear-aching thunder.

"But Sibyl?" I shouted.

Destanne shot me a brow-lifted smile. "Don't worry too much about Sibyl," he said, in a shout that was scarcely audible. "If we use our heads we can beat those devils. Guess I'll go turn in. This roaring doesn't bother you so much after a time—restful."

The smoking-room jolted slightly as if shaken by a mild earthquake. We were under way.

CHAPTER III.

The Menace of the Air-Plant Men

NIGHTMARE hours slid by. I was ill. Sleeping became gasps of dreaming horror. The cachet of tissue-wrapped clove-perfumed gauze which the steward brought me, did little to relieve my illness although it was highly recommended as a preventive of airsickness.

And my mental state was even more unhappy than my physical condition. What, exactly, was the peril which threatened Sibyl? What was the connection between the air-plant men and the 'Death Lily'? How did the air-plant men intend to launch their attack against humanity? Would they begin by wrecking the airliner upon which we were travelling? These, and a thousand other questions went racing through my mind during those semi-delirious hours.

But at last I slept. When I woke, Destanne was bending over me. The motors of the airliner no longer roared. The port-glass of my cabin was a disk of brilliant turquoise. The room flooded with sunlight.

"Come along, Roger. Shake it up," the Doctor was saying. "This is Batamano and the launch is waiting to take us ashore."

Batamano, I learned as I dressed, was a fishing village on the Isla of Batamano. This was the Caribbean, upon its deep blue water the great airliner rested, and the splashes of dazzling whiteness which dotted it were the sails of myriad sponge-fishing craft. We were within fifteen miles of "Shadow Island."

"You slept like the proverbial log," Destanne told me. "Here, climb into this. We're getting pretty close now."

From a chair beside me, he lifted a suit of steel chainmesh to which a massive steel collar, similar to the one he was wearing, was attached. "You missed Miami and all the rest," he said. "Just as well though."

Almost unnoticed by our fellow passengers, we clambered down the swinging gangway to the waiting launch. The body of the amphibian airliner stood tall above us as Destanne introduced me to the three bronzed men who helped us into the wabbling launch.

"Pedro is the mechanic," he explained. "Henrique they call 'El Practico', the pilot, and Francisco—well, he's just excess baggage. He owns the launch."

Sturdy, sun-tanned fishermen, they were fearless enough and square. They knew of the peril which lurked around "Shadow Island" but were indifferent to it. They laughed heartily at the chainmesh, collar and goggles we wore. And as they stowed the heavy trunk Destanne had brought, said they wished for nothing better than their machetes.

"That reminds me," put in the Doctor hurriedly. "Stick one under your own belt, Roger, right now. The moment you find yourself within striking distance of one of the tentacles don't hesitate, just *whack*."

I took the barbarous weapon reluctantly. Such things, I thought, were good for cutting sugar-cane, but not quite the weapon for a civilized man. I was glad I had slipped a .45 automatic into my shoulder holster when I left New York.

We were by now leaving the indigo bay of the Playa of Batamano and entering the greener waters of the open sea. Eagerly we scanned the blazing sky for a sign of a hovering scout of the air-plant men. There were none.

"You will find the goggles a great help," the Doctor told me. "The lenses are slightly tinted and act as color-screens to a certain extent. I've found the air-plant men are experts at hiding in a clear sky by chameleon-like color changes. The balloon-like part, too, is often quite transparent and scarcely more tenuous than a cloud of smoke."

"WHAT," I asked, "*are* the air-plant men?"

"Now you've asked me something," answered the Doctor gravely. "My opinions are formed from observations made during a hurried and very harassing encounter—Yes, very. This is what I suspect.

"Their amazing intelligence, their physical and mental make-up, everything about them, suggests that instead of being the devilish octopus-like creature which we are

by circumstances forced to think them, they are much more highly developed than we are. Therein lies their deadly menace.

"Going back a little, you will remember that our earth has been ruled from time to time by varying types of creatures. Each of these was replaced by newer, more efficient ones until, climbing the evolutionary scale, we find man dominating the scene.

"Good. Now we know the part evolution played in these changes and the extent they were hurried along by the sudden mutations of radically new types. Also, that each of the creatures to dominate the scene—even man himself—put in a first appearance as an almost defenseless creature.

"For ages man survived as a weak and unimportant inhabitant before he stepped up to anything like a dominant place. So weak was he that, if the creatures then dominating had even guessed that he was to be their successor, they could have wiped him out in a day.

"Judging, then, by what had gone before, the fact is pertinent that the creature which is to replace man must be already somewhere on this earth of ours. By now, man's successor must be gaining a foothold. By now, some mutation or some amazingly new branch of—of man himself, possibly, must be somewhere hiding and growing, furtive and hunted most likely, but gaining strength for the overthrow of the very parent from which he sprang."

Destanne lapsed into speculative silence.

"And you infer that these air-plant men are our superiors?" I asked, with some heat.

"Possibly, possibly," Destanne murmured, quite unmoved. "Don't rush to conclusions, Roger. I believe I'm correct when I say that their superiority—intellectual superiority—is almost beyond our grasp. Of course, I'm puzzled. But that balloon-shaped body of theirs suggests a head—an awe-inspiring, skull-less brain. Their multiple eye suggests something, too. You've noticed that it isn't a mechanical contrivance like the multiple eye of a fly. Each pair of eyes is an individual, characteristic, independent affair."

THROUGH my goggles, I had been watching the blue horizon of a placid sea. High above us, a single saber-winged bird soared. From beside me, came the idle slap of wavelets against the bow of the launch and the *put-puttering* of the asthmatic motor. A blazing tropic sun hung in the western sky, but the heat continued to be intense. Blistering heat. A tranquil sea. And a light breeze at our backs, oven-hot.

"Hot enough to hatch devils," I commented.

"Man," Destanne reminded me, with exasperating calm, "had his origin in warm climates."

"Nonsense," I exclaimed. "You've let this heat and the idea of these things run away with your imagination. They're new. They're unpleasant to deal with, like an octopus or a shark; but they're far from being what you think them to be."

Directly ahead of us, land showed as a short, black line thickening the horizon. A shadowy line that would have been scarcely visible had it not been for a growth of palm trees whiskering one end of it.

"If I'm not mistaken—our destination," I announced.

Destanne nodded agreement. "Shadow Island," he said, a touch of awe in his voice.

"Right," I said, fingering the .45 automatic under my armpit, and cursing the heat and the chainmesh. "It is, eh? Well, if Sibyl's there, held by man or superman, I intend to find her and bring her back—or raise Hell trying."

Destanne shot me a quick glance; smiled slightly at my enthusiasm—a trifle sadly, I thought. His manner galled me unreasonably. I pointed at the wretched little cayo we were now rapidly approaching.

"Sibyl's there," I said. "For some reason I don't doubt that. That she's being kept there by force in the manner you suggest, is another thing. You've been precious quiet as to how and why these so-called air-plant men, are doing it."

"I really don't know," Destanne said meekly. "At the time we were seized and I managed to hew my way out with a machete,

it seemed to me that the air-plant men handled Sibyl with the greatest care. Carlos, the boatman we had hired to come with us, they smashed to a pulp in something less than ten seconds."

We were close in now and headed for a beach where a sunparched sand bank of dazzling whiteness drifted down almost to the waters' edge. A barren shore, spotty with scraggly bunch-grass, and away to our left a stretch of saltmarsh, mangrove-covered.

"Not a sign of life," I commented, standing up in the bow of the launch and tempted to tear off the metal collar which, under the sun's scorching rays, fairly seared my neck. "I wouldn't be surprised if Sibyl—"

I broke off abruptly.

Above the crest of the hogback of sand directly before us, something rose slowly. Like a semi-transparent blue bubble it lifted against the skyline until it was just clear of the sandy range. It was roughly pear-shaped, some twenty feet tall by fifteen wide.

For a moment it remained, silent and motionless; then it sank behind the ridge. And I stood gaping and speechless and filled with the suspicion that I had been stared at and inspected by some lethargic giant who had merely lifted his head and peered at me over the ridge.

CHAPTER IV.

A Horrible Plan

"A LOOK-OUT, probably," said Doctor Destanne.

I turned to find Francisco was examining his machete, grim-lipped. Henrique was at the helm, whispering to himself in Spanish but keeping the launch on its course. We were headed straight for the beach which was now less than a hundred yards away.

"Will they attack us when we land, do you think?" I asked, suddenly feeling very weak and helpless.

"That remains to be seen," replied Destanne. "I doubt it, for we are to windward of them. We came up on them from that direction because I've found that their flight isn't well controlled. They seem to rise by inflating themselves with some very light gas, internally produced and probably heated. Their direction appeared to me to be largely a matter of selecting the right air currents—like a balloonist. Although, sometimes I suspect they are able to rocket themselves for short distances by the ejection of air from tiny openings placed on their under surfaces."

Henrique shut off the motor. The launch drifted silently forward, until it nosed softly onto the sand at the water's edge. Only the pouring of the waves and the long-drawn hiss of sand-laden water disturbed the utter silence.

Doctor Destanne was the first to spring ashore. I followed quickly after him, and Francisco and Pedro brought up the rear.

I was intent upon watching the place at which the air-plant men had peered at us. For this reason I scarcely noticed that the two fishermen were carrying ashore the trunk Destanne had brought along.

We were climbing the ridge by that time and I was too busy struggling up the steep sandy wall to comment on the matter.

This embankment was less than twenty feet high but steep—unnaturally steep, I thought. Every step of our climb was a sweating agony. Many a time the crumbling and uncertain surface gave way beneath us and we slid to the bottom.

But eventually we gazed over the crest and over the amazing expanse which formed the interior of the island. Roughly circular it was, at least a mile in diameter, and deep, like the crater of an extinct volcano.

The similarity ceased at that though, for as I was quick to realize, the whole structure was artificial. The entire area had been scooped out to a depth of some thirty feet. The ground was approximately fifty feet below us.

And it was cultivated ground, watered seemingly from a meagre stream which emerged by way of the mangrove swamp. Without pathway or trial, a single field close-covered with a pale blue flower, it was one sweep of blue—a pastel, dainty hue.

"The 'Death Lily'," murmured Destanne. "The feeding ground."

I blinked and then saw what before I had thought was simply the result of atmospheric heat waves. The air above the field was shimmering as if heated air were flowing into the cooler space above the moist ground.

I saw now that the shimmering had a definite pattern. It was like a roof over the field; a roof formed by a myriad glass domes built row after row. Domes—glass globes, solidly massed. Huge bubbles—*air-plant men. Millions of them—their tentacles spread out upon the ground amongst the flowers.*

"Feeding," said Destanne slowly. "I'm not quite sure it's that, either. Notice the absence of perfume? The air should be positively reeking with it. I suppose they absorb that perfume—and maybe some infinitely subtle and essential gases with it."

I was staring, drymouthed, paying little heed as Destanne rambled on: "The necessities of their existence—air and water and the perfume of the 'Death Lily'. The latter they seem to need only occasionally, I suspect they take it in large, periodic doses."

MY glance had been wandering far and near for a sign of Sibyl. I had hoped to find her—if Destanne had told me the facts—wandering along the beach. My plans, scant as they had been, were to circle the island and perhaps find Sibyl waiting for us.

Now it seemed to me Sibyl must indeed be lost. What were we against this multitude of super-powerful, super-intelligent creatures?

Destanne was silent, and I was wrapped in thoughts of the most melancholy nature as we stared out across that vast blue field. Perspiration trickled under our goggles. It streamed beneath our metal collars.

Then, as if my worst fears had suddenly materialized, I saw Sibyl! Clear and plain I saw her. She was some three hundred yards to our left, supine as if resting. With the glasses that Destanne handed me I saw how death-like was the marble pallor of her cheek.

Stifling a shout, I seized Destanne by the arm. He saw her and his face became tense with the realization of her danger.

"If we go along this side," he said, pointing at the beach, "we might—"

Without waiting for words, I slid down to the beach. Ran, with the Doctor stumbling after me; ran, until I believed I was opposite the spot where Sibyl lay. Then I climbed like a crazy ant up the embankment until I again reached its crest.

A scrap of white paper like a pale pennant faced me. It had been wedged into the end of a short, split stock which was planted on the embankment. Sibyl's handwriting—

"If you come:"—the words spun dizzily before my eyes as I crouched and read on. "At first I was dreadfully frightened. They seemed such unnatural, ghastly creatures, these air-plant men.

"But I learned to understand them. Their multiplex personality puzzled me. The idea of a compound creature using a community brain was appalling. It was hard to understand how a group could live on indefinitely by subjugating the personalities of its members.

"Doctor Destanne called them the 'Air-plant Men'. He was nearly correct—except that each one is a composite of many members. In our struggle to escape, the Doctor shot at the group which attacked us. His shot killed one of its members. The group immediately sloughed off the dead member and prepared to absorb a younger one as a replacement.

"In some way not clear to me, they have selected me to be the replacement. I am to be absorbed and adopted as a member of the group which attacked Doctor Destanne. I understand my body will be unnecessary.

"My mind, entirely different in its views from the usual run of air-plant folk, is considered a very valuable asset—a stimulant to the group. The absorption of it will take time—possibly—"

As if the paper had suddenly become a venomous reptile, I cast it from me; pounded it into the sand with my clenched fist.

The Rescue!

AGAIN I stared at Sibyl, down there among the "Death Lilies". Her face was pale and upturned, eyes closed as if in sleep. Her khaki shirt was open at the throat; khaki breeches and leggings, sand-dusted. She might have been a corpse—yet I knew life still lingered in that sweet face, that a heart still pulsed in that sand-sprinkled form.

The thought sent me berserk. Heedless of the myriad eyes I knew must be staring at me, I sprang to my feet. Gun tight-clasped in my fist, I rushed down the embankment. Seven leaping strides, and I struck bottom.

Sibyl was at my feet and above me loomed great globular forms. I could see them more clearly now. Like captive balloons tipped by the sunlight they swayed, held down by a forest of taut tentacles. Tentacles that moved and reached out for me.

A single, sinuous arm slithered serpent-like across the white throat of Sibyl. Another, like a snake of soft glass, was brushing my face.

In a flash I had the machete out. *Hack-hack*, the razor-edged blade bit through the yielding stuff. *Hack-hack*, and with each blow, severed ends twisted and contracted like chopped eels.

A moment of madness, an instant of struggling, and I had Sibyl slung over my shoulder, her ankles crooked under my gun arm. Her head was hanging down across my back. How slight she was! How limp! But alive yet. I knew that by her very limpness—by a magnetic warmth.

An arm, a powerful constricting arm, closed around my throat; began lifting with power tremendous. *Thwack*, the blade of my machete rang with the very swiftness of the blow. *Thwack*, the handle tingled in my fingers. Ten feet of severed tentacle writhed about me, then hung still and flaccid.

I faced the steep slope of the fifty-foot embankment. Behind me, the air was thick with a lashing, writhing movement; heavy with a sense of soundless commotion.

Up and up I climbed, the blood mist of desperation thick before my eyes. Up and up.

The inner side of the embankment was smooth, moist and firm, due to some extent, perhaps, to the proximity of the damp, cultivated land. It offered a reasonable foothold. Fighting for breath I reached the crest. Destanne was waiting there, machete in hand.

"Down," he yelled, pointing toward the launch. "I'll cover the rear."

One step I took, then toboganned to the beach in a welter of dry sand; straightened up and began staggering off in the direction of the launch.

I could see Henrique in the launch. He was waving his arms wildly. His suntanned figure was black against the sky. His screamed words came to me in garbled Spanish that was meaningless.

Then a faint shadow, indistinct as the shadow of a passing cloud, swept over me. I could hear Destanne shout. A shot rang out. But I staggered on, heels deep-sunk in the sand.

The shadow passed. It was before me now stretched over the whiteness of the beach. Lashing tentacles, hissing like whip-lashes, cut the air over my head. Swiftly the thing bore down on the launch.

Henrique had ceased waving his arms. He stood now quite still, one foot resting on the boat's gunwale. Chest out. Machete flashing.

But the enraged air-plant man was too quick for him. A flick of a tentacle and a jerk. One moment Henrique hung high in the air, his arms gallows-twitching, legs dancing on air, head twisted, neck broken; the next, he was falling like a dropped weight, feet-foremost, into the blue water beneath him.

FROM somewhere not far behind me, came shouts of encouragement from Destanne. They seemed to me to be strangely out of place. The creature that had murdered Henrique was still floating high over the launch. Soon a horde of them would spring upon us from behind the embankment. Henrique's fate had been merely a

demonstration of what was in store for each of us.

Nevertheless, I plunged on toward the launch. A man struggling for a hopeless cause, my feet sank deeper with every stride. My strength was lessening with each gasping breath.

A little to my left, I saw Pedro and Francisco were also making for the launch. Until now they had been crouching in a hole they had dug at the base of the embankment. They came running now and pointing upward at the evening sky.

Were the air-plant men even now assembling their hordes above us? I gave one swift, despairing glance upward. Only a sky of cloudless blue was there. For some reason I did not understand, the air-plant man which had attacked Henrique was rapidly swinging off inland.

* * * *

In a huddle of striving humanity we met at the launch. "The breeze," Destanne was saying. "Thank Heavens it's holding. Had to go. See?" He pointed at the air-plant man drifting swiftly inland. "Couldn't hold his position with this light breeze blowing."

Francisco got the motor ready as I placed Sibyl tenderly in the vessel's stern and took my place beside her. The girl seemed to be sleeping. Destanne was grasping a slender wire to which what appeared to be a battery box and a switch was attached. The wire stretched from the still motionless craft to a point far up the beach.

Then, like a wall of transparent ice, the air-plant men rose above the embankment. A faint breeze still blew in from the ocean. The air was clear and flooded with long rays of a lowering sun. So clear was it, I thought of it as translucent water and the hordes of air-plant men that were rising beyond the ridge, as gigantic jelly-fish that floated; whilst we, infinitesimal creatures, were doomed to crawl over a strange ocean's floor.

Destanne was squatting on a seat; the switch-box in his lap. One arm he raised in a signal to Francisco who waited, hand on the starter.

With a hissed word of command, the little biologist snapped his arm down; shot the switch over.

The mighty roar which followed shook the launch, rocked the island, and blotted out the sunlight.

"*Madre de Dios*", I heard Francisco groan, as the *chug-a-chug-chug* of the launch's motor bit into the ear-throbbing silence that followed that blast. The buried trunk had been dynamite packed, I understood that now.

Sand-clouded darkness was all about us as we left "Shadow Island". The sea around us was pelted for miles with the rain of falling debris.

"The embankment," Destanne said, after awhile, "it's broken." Then, abruptly: "Well, well, if Sibyl isn't wide awake once more. Don't be alarmed Sibyl, I think we've beaten them."

The girl rolled her head from side to side. "A little water, nothing more," said Destanne. "Come along, Roger, snap out of it. There's a canteen beside you."

Clumsily I lifted the canteen to Sibyl's lips and she swallowed a little of the lukewarm fluid; rested her head on my shoulder again and closed her eyes.

Swiftly the launch was nosing into the breeze and we sped away from "Shadow Island". The place we left behind us was a smoking wreck. Above it, high above it, rose tier upon tier the floating hordes of the air-plant men. Slowly they were drifting away from us, driven by the westerly breeze, they sped eastward. Tier upon tier they rose, a golden argosy of strange and scintillating beauty which towered far into the cloudless sky. Their uppermost members were caught in the crimson streaks of sunlight which marked them against the sky as golden bubbles. Where would they go next? I wondered, as I glanced at Destanne.

"Their feeding ground flooded, destroyed," he said, noting my glance. "Mighty good thing for us the direction of the wind makes it impossible for them to overtake us for some time." He pased, then: "My original plan was to dynamite their feeding ground whilst they were heavy under the influence of the perfume which plays such an important part in their lives."

"The stuff must leave them groggy," I commented.

"Precisely. An essential food to them, just the same. Brisson has arranged for the destruction of the smaller beds they were establishing throughout the Southern States."

"Which will leave them quite defeated?" I asked.

"I hardly think so. They are marvellous balloonists,—tireless, effortless motion. They will establish new grounds. Central America, perhaps, or even Africa. Wherever the 'Death Lily' will flourish. Defeated now but a menace to posterity."

We lapsed into silence. The last of the air-plant men were vanishing into the shadows far astern. *Slap-slap,* the waves bounced the bow of the launch, and flew past us in threads of white spume.

Sibyl sighed and stirred restfully. I moved a trifle. Something was tangled around my feet.

Destanne followed my movements; he bent over and picked up one end of a ten-foot length of what looked like cable. Limp and dry, it hung from his hand, slick-surfaced.

"'Obviously a vegetable tendril," he chuckled, with a knowing smile, as he twisted the thing into a seamanlike coil. "If you don't mind, I'll keep this—er, piece of liana vine."

THE END.

What Is Your Knowledge of SCIENCE?

Test Yourself By This Questionnaire

1. What is the proportion of the weight of the hydrogen electron to the atom? (Page 634)
2. What is meant by the color "black"? (Page 637)
3. What is Newton's Third Law of Motion? How does it act in a rocket? (Page 638)
4. What would happen to a body on the earth's surface if suddenly freed of gravity? (Page 639)
5. What is ectogenesis? (Page 672)
6. What is agar? (Page 702)
7. What are the approxmate wavelengths of the limits of the visible light spectrum? In what classifications are the waves shorter than visible light placed? (Page 703)
8. What is the greatest and the shortest distance between Earth and Venus? (Page 718)
9. What are the speeds of Earth and Venus in their orbits? (Page 723)
10. How much would 120 pounds of earth weight be on Venus? (Page 731)

The End of Time

(*Continued from Page 679*)

familiar. It had the musty look peculiar to parliamentary chambers, and by the fixtures I knew that I had seen it before in pictures. I had even visited its modern counterpart. Rows of chairs were placed facing a dais, row on row, one above the other, as in a theatre. To one side sat a man with a gavel, dressed in the long frock coat, the stiff-bosomed shirt, the open collar and the soft black silk necktie of another generation. And in the center of the room stood another man, dressed like the chairman; a tall, heavy-set, severe-looking individual, with a brow like the dome of Saint Peter's, and the jaw of a mastiff. The man was speaking in a rich, sonorous, voice, slowly, distinctly. The audience paid him the tribute of hushed attention.

"In this respect, sir," he was saying, with a note of satire in his mellow, resonant, voice, "I have a great advantage over the honorable gentleman. There is nothing *here, sir*"—and he placed his hand over his heart—"which gives me the slightest uneasiness; neither fear, nor anger, nor that which is sometimes more troublesome than either, the consciousness of having been in the wrong—"

And so it went on, this stately, courteous debate of a bygone day. There was something familiar about the speaker's face and words. I recognized the old senate chamber, pictures of which I had studied; and then it all came to me in a flash.

"My God!" I exclaimed. "It's Webster beginning his reply to Hayne!" I knew the opening words, which I had studied years before, in which the great orator laid special emphasis upon Hayne's use of the word "*here*"—with its accompanying gesture of indicating the heart.

I was standing listening to the beginning of the greatest extemporaneous speech ever made in the United States. And then suddenly I remember something else. "Webster spoke steadily for twenty-four hours!" I said to myself. "I must get out of here before Brown regains consciousness and kills me with contempt!"

Slowly my historical knowledge came back to me. The reply to Hayne was delivered at the end of January, 1830. I had overshot my mark by exactly one century! "Not so bad for an amateur, in a space of seven million years," I said aloud, as I turned the control and the senate chamber and the majestic speaker faded from view.

To come to my own century, my own year, was the work of a fraction of a moment. As the familiar cavern formed itself around the crystal globe, as the lights stopped glowing, and the vibration ceased, I breathed a prayer of gratitude to the destiny which had brought me safely back to my own world and my own time.

I held a vial of smelling salts under Brown's nose. He moved his head feebly in an effort to avoid the pungent odor, and opened his eyes. "All out," I quoted, taking unfair advantage of a wounded man, "this is as far as we go."

I dragged him from the machine and out into the cavern. He looked around, noted the familiar surroundings, and thanked me with a look. "Well," I said, "can I operate that machine, or not? Where would you be without me? Do you realize you've been unconscious since we left—that is, for seven million years?"

In spite of his pain, Brown smiled faintly. "You're all right," he whispered. And that was the greatest compliment I ever received from the master of time.

Many a time I was tempted to tell him I had seen and heard Daniel Webster, a man whom he had never seen and never heard. But that would have made me subject again to his satirical remarks on my abilities. And after all, how do I know he has never seen and heard Webster? With a man like Brown one can never be sure of anything—unless it be the certainty of adventure such as the world has never known.

THE END

The Silent Scourge

(*Continued from Page 697*)

timately involved with the manufacture of the XY gas by the government that as far as possible it has been minimized. No objection was made to the publication of this account, however, as long as no details of certain confidential matters were given.

Benson is very modest as to his part in the campaign against the millipedes. He asserts that it was purely accidental that he was placed in a position where he received credit that was equally due a number of other men. He accepted under protest the special medal voted by Congress.

Assurances have been given by the Chemical Warfare Division that precautions will be observed in the future manufacture of the XY gas which will make any repetition of the tragedy impossible. Meanwhile scientists are somewhat disgruntled be because the government refuses to furnish any of the X-substance for experimental purposes. They consider it of the highest scientific importance that the reason for its astounding effect on the millipedes be investigated. They believe such research would bring them appreciably nearer to the solution of the fundamental problems of biology.

Evidently the government thinks that certain practical considerations are more important. At any rate, it is at the present time observing absolute silence in regard to the X-substance. In response to recent inquiries it has even denied any knowledge of its existence.

THE END.

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are the verdicts of our readers greeting

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"An ATOMIC ADVENTURE" is Doctor William Lemkin's offering to the galaxy of stars in this issue. Here is a most unusual story that we venture to say will keep every one wondering until he has read two thousand words.

All These and More in the

FALL 1930 WONDER STORIES QUARTERLY

Now On Sale At All Newsstands

Science Questions and Answers

THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited we cannot undertake to answer more than three question for each letter. The flood of correspondence received makes it impractical, also to print answers as soon as we receive questions. However, questions of general interest will receive careful attention.

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These nationally-known educators pass upon the scientific principles of all stories.

Frigid Space

Editor, Science Questions and Answers:

How do scientists know that space is frigid? Is it because the higher one goes the colder it becomes, and therefore when one gets well away from the earth it is intensely cold? I would appreciate the answer to this puzzling affair.

Ronald Small,
601 West 173 St.,
New York City.

(To answer this question, we must first get clear what is meant by temperature. Let us suppose that we place a thermometer on a body whose temperature we wish to measure. The thermometer shows 50 degrees centigrade. What we have really measured is the temperature of the thermometer, because we have waited until the temperature of the thermometer is steady, and therefore the thermometer has reached the same temperature as the body we are observing.

We can only measure the temperature of material bodies, such as gases, liquids and solids. We can no more measure the temperature of space than we can measure the temperature of time.

It follows, then, that empty space with no material such as gases, liquids or solids in it has no temperature, and if we were to take a thermometer out into space we would measure the temperature of the thermometer itself.

What happens to a body in empty space is this: it has in the beginning its own intrinsic heat. It receives heat from every body in space that is radiating, and it radiates heat itself. Now the temperature that a small body will have in empty space will depend on how much heat it receives and absorbs and how much it radiates away. The reason why a human being would perish in open space is that the side of him that is toward the sun would be warmed, but before the heat could penetrate through his body to the sunless side, he would have radiated enough heat away to make him frigidly cold. Even a body like Mercury, which can be considered in empty space, has its sunny side unbearably hot, and its sunless side intensely cold.

So we cannot speak of the temperature of space, we can only speak of the temperature of bodies that are in empty space, and we can speak of how hot they are by considering how much heat th receive and how much they lose—Editor.)

The Wonder Tube of Radio

Editor, Science Questions and Answers:

There is one particular thing of interest to me, a paragraph entitled, "Magic Radio Tube Works Wonders"; and in it you state the various wonderful things that this Radio Tube has done, and that "Elevators can be leveled with quick accuracy."

Now I am very interested in elevators, or lifts as we call them, and I am writing to ask you how this system of levelling by means of this radio tube works. Any information, however small, would be greatly appreciated by me, and I sincerely hope you will be able to furnish me with many particulars.

I may also say that your magazine has afforded me many hours of enjoyable reading, and may I wish you and your publications every success.

Frank Wm. M. Pick,
Gilstead, Yorkshire, England.

(The self-leveling of elevators is accomplished by the use of a photoelectric cell with a suitable relay. The pressure of a button lights a lamp opposite the floor level desired; when the photoelectric cell, set under the car, comes opposite this signal lamp, it passes a current which operates a relay and stops the car. The principle is simple; its application, of course, is a task to be worked out very carefully by engineers. In many of the apartment buildings in this city there are no elevator attendants; the passenger steps in, presses a button designating the desired floor. The door closes automatically; the elevator moves up or down to the desired floor, stops and levels itself, and the door opens again. If the button is pressed from another floor, the elevator closes itself and descends or ascends to the desired level. A similalr device has been installed among the bookstacks of the Library of Congress, at Washington, for the use of the librarians traveling between different levels.

This type of photoelectric cell is the alkaline-hydride tube type. The old selenium cell is very efficient, but takes a somewhat longer time to react to a change in light. The photoelectric phenomenon is the basis also of television, now being demonstrated in England by Mr. Baird, and here by several experimenters.—Editor.)

The Weight of the Brain

Editor, Science Questions and Answers:

What is the weight of the human brain? Does it differ for men and women? What percentage is it of the total weight of the body?

George Willner,
Sunnyside, L. I.,
New York.

(The accepted weight says Arthur MacDonald, anthropologist of Washington, D. C., of the human brain is 49 ounces which is 2.37 per cent. of the weight of the entire body. From 11,000 brains weighed, Topinard, an authority on the question found an average weight of 1,361 grams, or 48 ounces for the brain of the male and 45½ ounces for the brain of the female. Of the total weight of brain, the "grey matter" represents 37 to 38 per cent.—Editor.)

How Zeppelins Descend

Editor, Science Questions and Answers:

Would you mind letting me know, how the descent to earth of a lighter-than-air ship (zeppelin or blimp) is accomplished? I understand that as long as an airship is lighter than air, it remains up or keeps ascending. How can it be made to come down? I mean this: Is it the motion of the propellers that pushes it down or what is it? A general explanation will be sufficient, for all I want to know is the cause of the descent.

G. Cataldt,
P. O. Box 237,
Springfield, Mass

(A power-driven Zeppelin or blimp, the same as an airplane, has at its tail a rudder that can move in a vertical plane, in other words up or down from the horizontal. If the Zeppelin is moving straight ahead and wishes to descend, the rudder (or "elevator" as it is called) is depressed. In other words it inclines downward. The air that rushes at it therefore tends to give an upward impetus to the elevator and therefore to the tail.

Since the tail is raised, the nose points downward and the craft can descend. The reverse is used if the craft wishes to rise. A Zeppelin or blimp has its structure so adjusted that when it is fully loaded it just floats in the air. In other words, under such conditions a single man could hold up a giant Zeppelin. Therefore the Zeppelin neither rises nor descends by virtue of its buoyancy, the buoyancy merely gives it the power to remain in the air without moving. —Editor)

Measuring the Distances of Stars

Editor, Science Questions and Answers:

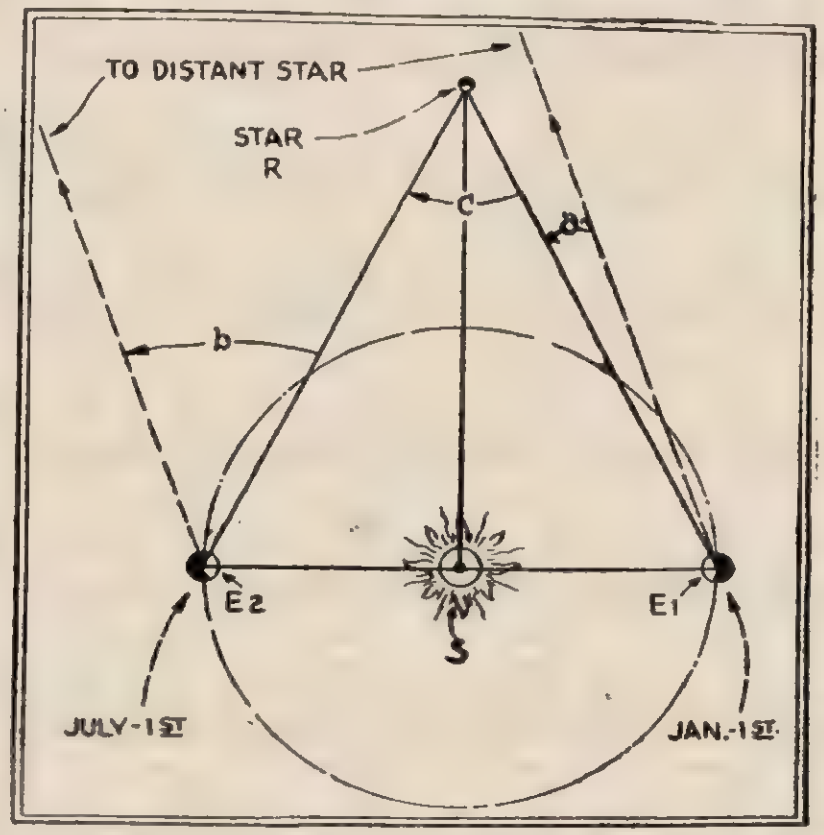
There are a few questions I would like to ask you:

1. Is the sun's energy conveyed to the earth by light rays which, on striking the earth's atmosphere are converted into heat waves?

2. Are all the stars restricted to slight movement with regard to the earth? If not, how can the triangulation method of finding the distance of a star be used? For certainly the star would have changed its position considerably in six months?

George Currie,
Sudbury, Ont., Canada.

(1. The energy of the sun is radiated in the form of electromagnetic waves of all lengths, depending on their frequencies; only a small portion of these are seen by us directly as light. Other waves, differing from visible light only in wavelength, are not perceptible to our eyes; they have the property rather of generating heat in objects which they strike. There is no absolute difference in the nature of light waves and heat waves; the effects which they produce depend rather upon the physical and chemical natures and the sizes of the objects which they strike. Each set of waves has a tendency to set up activity (whether heat or—as in our eyes—chemical action) in substances the particles of which are of a size which bears a certain ratio to their particular wavelength. It is quite probable that some of the sun's radiation is converted into long or heat waves in the atmosphere; but, at the bottom of the atmosphere, we are able to measure only what radiation gets through to us. When scientists are able to ascend through the atmosphere into space, they will be able to tell us more about this.



2. All the stars are in motion, and in the case of the nearer stars, this movement is measurable by their displacement against their background. Sirius, the brightest star and our very near neighbor, has moved in the past two thousand years apparently about the width of the moon—a distance actually numbered in billions of miles. This "proper motion" has been computed by astronomers for all stars which are near enough to have an observable parallax; and is taken into account. Astronomers make great numbers of corrections for this and that source of error in measurement, and repeated observations over a period of several years, before they venture to estimate the parallax of a star.

The triangulation method is illustrated in the accompanying diagram. It follows the same principles as the work of a land surveyor, except that much more delicacy of measurement must be observed. The parallax of our nearest neighbor ALPHA CENTAURI corresponds to a yearly movement, back and forth, of less than half an inch at a distance of a mile; and the telescopic observations must be corrected for apparent motions which cover many times this distance. —Editor.)

In this department we shall publish every month your opinions. After all, this is your magazine and it is edited for you. If we fall down on the choice of our stories, or if the editorial board slips up occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brick bat. All are equally welcome. All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 25c in stamps to cover time and postage is remitted.

An Author Confesses

Editor, WONDER STORIES:

It is not because I am a contributor to WONDER STORIES that I advance this theory, which has in my own experience proved itself: A reader of the incredible—namely science fiction—is thus more quickly broadened in mind than by any other means I can conceive. His world ceases to be a single village or town or city or planet, but broadens out into the vastness of the speculative, into the far flung reaches of infinite space and time and thought, into beautiful fields of worlds where the suns of Andromeda and the Milky Way shine upon worlds of the Realm of the Great Beyond.

The stark immensity of it amazes one. The sheer beauty of it stimulates the senses, casts to the four winds of this tiny speck rolling in the atmosphere, the importance of the things about which a man worries. Wherefore is beauty but in dreams? Wherefore is reality but in thought?

Going through the pages of this daring publication, I came upon the story by Francis Flagg, entitled "The Lizard Men of Buh-Lo", and after reading that masterpiece of imagination I lay the book down to begin writing here and say that every man who expects to amount to a whoop in this world of great demands should read science fiction because it trains his mind to think in terms broader than he has been accustomed to.

I ought to know. I recal when I got my first copy of a science fiction magazine and began reading it. I threw it aside in disgust. A few months later I was writing a story for Mr. Gernsback. It was published. I said that I would never go beyond the probable again, but the more I read such stories as "Marooned in Andromeda" and the many others published during the past few months in WONDER STORIES—I wish I could write them—the more I realize that while we read to be entertained we might also read to think, and to dream and to create. Personally, I have built up a religious belief—or rather I have approached a sort of probability—by reading science fiction and delving into the mysteries of science through as many of its branches as time will permit.

Edsel Newton,
Billings, Mo.

(It's quite stimulating to read a frank confession—such as Mr. Newton gives us. If science fiction didn't do the things that he says they do, we would have to quit publishing. But our magazines have grown because we give our readers something to take them beyond themselves—so that, as Mr. Newton says, they can grasp greater immensities and have thoughts they would not have had otherwise.

Mr. Newton also makes a startling statement, but something that verifies what the Editor said during a recent controvery. That, by understanding the physical universe one can really find a meaning in it and from that meaning he can find a religion. We wonder if any of our other readers have had such an experience, and whether we dare ask Mr. Newton to tell us more about it.—*Editor*)

Interplanetary Society Progresses

Editor, Wonder Stories:

For your information and that of your readers, may I intrude into your columns to tell you something of the progress of the American Interplanetary Society?

Full activities were resumed recently, the New York group holding several important gatherings at the American Museum of Natural History. At each meeting, a new phase of interplanetary travel and its problems was presented by one of the members. These meetings, open to the public, have been attracting considerable attention.

At the last few meetings such problems as: the landing on a strange planet; the possibility of life existing on other planets; the problem of communication between the planets have all been discussed. The latter talk delivered by Mr. Clyde Fitch, a radio engineer and member of the Society brought forth an interesting editorial in the *New York Times* of October 6.

The Society is now undertaking a complete research on the possibilities of the rocket and expects to issue reports in sections over the next year or two. In this way it hopes to make an important contribution to the science.

Its membership continues to grow. There are members not only throughout the United States but also in Canada, Mexico and France. Among our members are Dr. Robert H. Goddard the American rocket expert; Robert Esnault-Pelterie, the French rocket expert; Captain Sir Hubert Wilkins the noted explorer; Dr. Clyde Fisher of the American Museum of Natural History; Noel Deisch, the second foremost American rocket expert, Hugo Gernsback, well known to the readers of this magazine.

The Society offers associate membership at three dollars per year to interested men and women. This entitles the member to all the privileges of the Society (except in the conduct of its business) including the monthly Bulletin now being expanded to eight pages. Active membership is open to men and women over 21 years of age with a good background of scientific knowledge and education. Such members have a splendid opportunity to be pioneers in this greatest achievement the twentieth century is attempting. Active membership is at the rate of $10.00 per year, or $3.00 per quarter, if paid quarterly. Further information can be obtained by writing the Secretary. Membership blanks will be mailed on request.

C. P. Mason,
Secretary, American Interplanetary Society
302 West 22nd St., New York

(The American Interplanetary Society is making itself felt more and more as a power in America leading to an awakening of the public to the possibilities of interplanetary travel. We commend it heartily to our readers.—*Editor*)

Providing They Are Killed

Editor, Wonder Stories:

On finishing the September issue, I'd think it unusually good, especially "The King of the Black Bowl," by Mr. Starzl. Hope you print another of his stories soon. He write marvelously.

Mr. C. K. Rodgers' spasm amused me greatly. He says he isn't a "woman hater," but there's a fly in the ointment somewhere, because he admits he used to get a thrill out of a nice moonlight necking party. But I don't call that romance; it is slushiness, and surely anyone can see the difference.

No, Mr. Editor, we don't want "cold-blooded" scientists—in stories or otherwise, for they are NOT like that in real life. They ARE human and fiction cannot change them, except to make them distasteful, to the reader. So let's have our heroes scientists—*super-men, of course*—but warmhearted and sympathetic and in love, or capable of being. Life is teeming with romance, so our fiction should not be entirely devoid of romantic interest.

(*Continued on Page* 757)

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The HOTEL LUDY
ATLANTIC CITY, N.J.

On Page 764
you will find at the top of the column an interesting announcement. If your subscription to WONDER STORIES expires with this issue or the next, the few minutes spent in reading this message will be well worth your while.

THE READER SPEAKS

Continued from Page 754

The villains in *WONDER STORIES* may be as ruthlessly cold-blooded and calculating as even Mr. Rodgers could desire—provided they are killed off in the end—but I'm sure the vast majority of readers prefer their heroes to be "human like themselves, with normal human desires."

Though the Ozarks seems far removed from the center of scientific achievement, *WONDER STORIES* brings it right to our door. Long may it live and prosper.

Clara E. Bush,
Decatur, Ark.

(Miss Bush seems to have a point of view not expressed before on the romance vs. science, cold-blooded vs. human scientist debates. Like Miss McCable of "romance" fame she wants romance in her stories. She does not want slushiness, and does not object to cold-blooded scientists. Miss Bush presents a new nut for the no-romance die-hards to crack, what do they say to her program?—*Editor*)

Statues From the Dead

Editor, Wonder Stories:

I want to comment shortly on the new quality of *WONDER STORIES*. It certainly is improving in highclass stories, and the new paper seems to me to be more convenient as it makes the magazines thinner, which is invaluable to me as I have a perfect clutter of magazines, all of yours, and many others for years back. Therefore, space is important.

An especially good feature is the discussions columns, which certainly are as great an aid to educating the laymen as the stories themselves. The Science Correspondence Club has always believed that science fiction is one of the most powerful assets science can have. During the five years that it has come into prominence, I do not hesitate to say that many inventions of the last two or three years have been suggested by this type of story. At least, the fact has followed the fiction very quickly in many cases.

Some years ago you printed a comic story of two men who experimented with a copper embalming invention and unfortunately tried it on themselves. Just lately, a report from Russia announced that the dead could be turned into copper statues in this manner, and instead of burial, used to grace the lawns of the estate, etc. It seems even the wildest and most comical science fiction comes true. What then may we expect of the more serious kind? The type of story that peers into the future with scientifically trained eyes, and sees what is to come? But enough of this. I must return to the abhorred bod. After the last few weeks I have decided that more stories by Drs. Breuer and Kellar are in order. At least their treatment only costs a quarter per.

Raymond A. Palmer,
Sec'y. S. C. C.
Milwaukee, Wis.

(We would not credit too much the report from Russia that they plan to use the dead as the base for statues. The Russian is very superstitious and all superstitious people are much concerned about their dead—at least they have a great reverence for them. From the great upheaval that the Russian people are experiencing, much that is foolish and silly will be heard. The Russians are trying hard to find their place in the world of science and among them are extremists who carry logic a great many steps too far.

During the war we were alarmed to hear that the Germans were making fertilizer from their dead. No doubt there was a grain of truth in the story—some over-efficient German engineer was trying to save the Fatherland by such a proposition. The story was never substantiated, and probably was not true.

No doubt the future will give us many new ideas on our relation to the dead. We know that the burial of dead was not originally for the preservation of the body but to make sure that the dead man did not return to haunt those he left behind. He was supposed to have acquired some "evil forces", and he must be deprived of the ability to do damage. With the ages the idea behind burial suffered changes and to-day the burial serves the purposes of public health, sentiment, and family spirit. Perhaps in a future age cremation will be universal or the willing of bodies to the state for research and experimenting will be necessary.—*Editor.*)

(*Continued on Page 758*)

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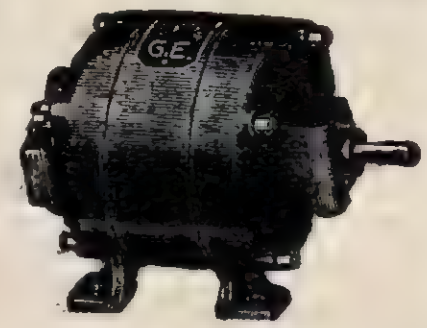

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THE READER SPEAKS

Continued from Page 757

Pearls Before Swine

Editor, Wonder Stories:

Its difficult for me to make a mild expression of my esteem. I consider you a very generous benefactor and am selfish enough to wish you a long and prosperous career as a server of the same sort of diet you are giving us now.

I think I enjoy the "Reader Speaks" most excepting when we run across such bilge as that tendered by "no address" Cody. Don't you care. We're all with you and things like that mage us realize the meaning of "casting pearls before the swine". I just lapped up "Marooned in Andromeda". You surely do dish up the cream.

I am sorry I have no suggestions as to how you should do your job. After all you've had a *little* experience and I do believe you know your work, at least better than I do. I feel we can trust safely "our" mag in your hands leaving the work, worry, vigilance to one who has proven his worth. I know you will never abuse our faith in your ability to keep a good balance of science, adventure and lastly a sprinkling of romance when needed in the inimitable *WONDER STORIES*.

Mrs. C. Christiansen,
4226 Van Buren Street,
Chicago, Ill.

(Unfortunately, we can't feel the way Mrs. Christiansen does about casting "pearls before swine". We are just foolish enough to feel like the man who had charge of 100 sheep and ten wandered away. He left the ninety to bring back the ten. We don't want our readers to wander away from their magazine. We feel that our readers do appreciate what we are giving them. When difficulties arise, as in the case of Mr. Cody, we think that they were the result of too hasty conclusions, undue suspicions, etc., and when they are cleared up, we will all be good friends again.

It's easy enough to adopt a high-and-mighty attitude and say, "Well if you don't like it go back where you came from." Just as our 110 percent patriots want our government to do with its radicals. But that's a foolish attitude. If there's anything wrong with a government, a man's body or a magazine, the sensible thing to do is to find out what it is and cure it. If it's a misunderstanding only, as it was in Mr. Cody's case, everyone can be enlightened and made happy. But we thank Mrs. Christiansen for her nice sentiments. May we continue to dish up the cream.—*Editor*)

Hurrah For the New Size!

Editor, Wonder Stories:

The 87½ per cent that voted for the change in the size of the *WONDER STORIES* magazine surely did know what they were voting for. I measured the new size on an old magazine and was greatly impressed by the improvement that I could see there. Hurrah! for the new size.

In reading about space cars, I have often wondered how can propellers be used in space where (as far as I can find out) there is no atmospheric resistance. I served in the air service during the war and understand how the propeller pulls the airplane through the air but I can't understand what good they are where there is no resistance. Please enlighten me on that point!

How about some oriental science fiction? I understand that they have a science of their own. Am I correct?

Fred G. Michel
387 Milton St.,
Oakland, Calif.

(We're glad that Mr. Michel is included among the throng who were so pleasureably delighted with the new mag. size. We believe our readers will find that this issue has even more material than the last. Propellers are not used for flights into space. Obviously they are useless where there is no air. The rocket which does not depend on air is the only means found thus far to operate in a vacuum, for the rocket needs no air.

Oriental science is a closed book to us occidentals. Orientals may perform their miracles by means of a science we are ignorant of, or it may be all trickery, fooling us by taking advantages of our sense of sight and touch, etc. We wish we could learn how they do some of their magical tricks.—*Editor*)

THE READER SPEAKS

By Every Atom in the Universe

Editor, Wonder Stories:

I am now going to annoy you with my humble, but honest opinions. I only hope I can consider myself an old reader since I've read about two dozen of our mags in three months. How? By blowing all my allowance on back-numbers.

You know if you stopped publishing this mag I'm afraid I would commit suicide. But that's only half of what I think of the dear old mag. so here's the *other half. Multiply every atom in the universe by* every ray of light the sun gives off in a million years. Then multiply the answer by every "Pee Wee" golf course in the U. S. And I think you'll get a vague idea of what I think of your WONDER-ful mag.

As for my likes and dislikes I term the stories as follows—

Best.

"The Human Termites" .....Keller (Hooray)
"The Conquerors." .....ditto, ditto
"Shot Into Infinity" .....Gail
"Stone From The Moon" .....Gail
"Flight of the Mercury" .....Tanner
"Electropolis" .....Von Hanstein
"Moon Conquerors" .....Romans
"Infinite Brain" .....Campbell

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By Hendrik Dahl Juve

"THE ISLAND OF TERROR"
By Ransome Sutton

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Good

"The Time Valve" .....Breuer
"A Subterranean Adventure" .....Bauer
"Lizard Men of Buh-Lo" .....Flagg
"Into the 28th Century" .....Lorraine (sequel?)
"City of the Living Dead" .....Manning & Pratt
"In 20,000 A. D." .....Zagat & Schachner

Worst

"The Bat Men of Mars" .....Don't care for
"The Lost Martian" .....Don't care for
"Radiation of the Chinese Vegetable" .....Gleason
—And all the rest are O. K.

As you may notice from my choices, I also read *WONDER STORIES QUARTERLY*. And by the way, Your Summer, 1930, cover drawing shows the spaceship a brilliant red, while in the story it is taken from it states that the clouds enveloping Neptune shut out all the sun's red rays. Then how is it the ship appears red?

Now for the real purpose of this letter. I want to know if you (by any rare chance) publish the work of amateurs, excepting in contests, as I am now

(*Continued on Page* 760)

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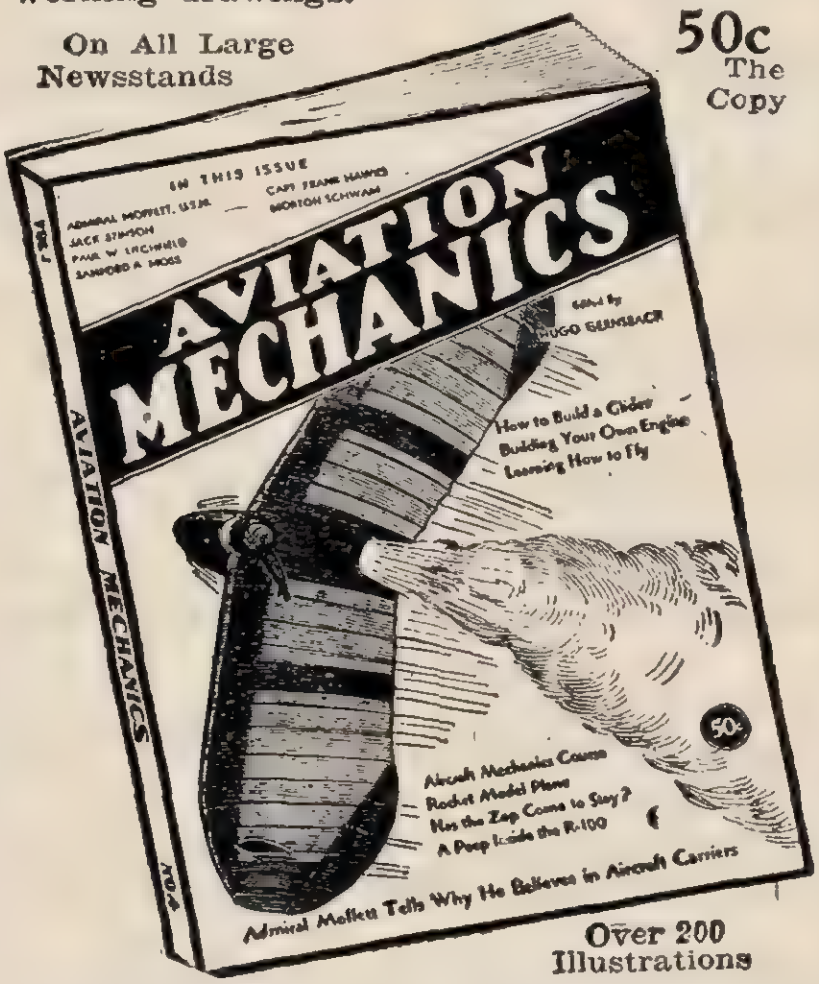

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THE READER SPEAKS

Continued from Page 759

writing a story of the type you publish. Although I am but fourteen years old (I'm blushing), all my previous efforts have met with hearty approval from my literary teachers and friends, likewise ardent readers of your magazine. The story—The Martian Time Machine"—is a cross between an interplanetary and a time traveling theme. So with many wishes of your continued success, Adios.

James H. Nicholson,
40 Lunado Way,
San Francisco, Calif.

(We certainly do publish the work of new authors. Our contests have been notably successful in that they stimulated non-professional writers to "try their hand" at our stories. The result was that they found they had a good time at it, and discovered a talent in themselves. A writer must at one time be a beginner; and to such beginners we are happy to offer our advice and criticism. But we say, in the beginning, that the average amateur starts to write his story before he has studied the art of fiction. There are rules for the planning of stories, just as for the planning of bridges. Numerous books on the short story will offer much help and by getting the beginner started right will help him to avoid much of the disappointment and heart-ache that is likely to occur.

So before sending stories to us, get some critical opinions on them. Study the short story art and then put your story away for a few weeks. Come back to it afresh and read it critically as though it were the work of some one unknown to you. Then after finally revising it, and assuring yourself it's the best job that you could do, send it on to us. —*Editor.*)

The Boys Scientifiction' Club

Editor, Wonder Stories:

We would appreciate it very much if you would print this in your "Reader Speaks" department.

We wish to inform the readers of *WONDER STORIES* of an organization lately formed, called "The Boys' Scientifiction Club." Its purpose is to promote scientific interest among boys between the ages of 10 and 15, to encourage the reading of science-fictional and scientific works, and to create a bond of friendship among them.

A circulating library, composed of scientific-fictional books, magazines, articles, etc., is being constructed to circulate among members who desire to read any of the contents.

Officers are: President-Librarian—Forrest J. Ackerman, 530 Staples Ave., San Francisco, California. Secretary-Treasurer—Frank Sipos, 174 Staples Ave., San Francisco; the writer being Vice-President.

Address all letters concerning membership to the President. He will be glad to answer all letters and explain particulars of the Club.

Linus Hogenmiller,
Vice-President B. S. C.
502 N. Washington St.
Farmington, Missouri.

(Every such club as your young readers have formed in San Francisco is a step in the right direction—toward spreading of science fiction throughout the people of the country.

But such clubs should not rest content to confine themselves to their own friends. The great work to be done lies among the present scoffers or people who are indifferent. The greatest enthusiasts are very often those who were previously the greatest doubters, and each such person once converted is firmly held, from then on. We wish the B. S. C. the best of luck.—*Editor.*)

They Worshipped Their Progenitor

Editor, WONDER STORIES:

I wish to 'go to the bat" on behalf of two of your best authors, Ed Earl Repp and Henrik Dahl Juve. Also, to take issue with certain criticisms advanced by Herbert Fixler in the September issue. Mr. Fixler says that he wshes you would get rid of the two promising young men mentioned above, because their stories contain the same fundamental plots each month. I flatly declare that they do *not!*

I am a regular reader of four science fiction monthlies and two quarterlies, and therefore am in a

(*Continued on Page 761*)

THE READER SPEAKS

Continued from Page 760

position to compare the work of these men, as well as that of all the other authors mentioned by Mr. Fixler. Mr. Repp and Mr. Juve are both well grounded in science, and possess fertile and versatile minds, and I always turn to their work with the confident expectation that I am to be well repaid for the time spent in reading it—and am never disappointed.

Regarding another criticism: "Cut out the science." Please do not commit any such egregious error! If the critic doesn't like science with his fiction, let him work out on any one of the fifty-seven or more varieties of trashy magazines that we who love real science fiction are forced to inspect in order to pick out the ones we really value. There are so many of these on the newsstands that a person gets dizzy trying to locate the desired cover.

Now, just a word of constructive criticism regarding a scientific detail in Mr. Repp's "The Annihilator Comes," in the August issue. This is a crackerjack of a story all the way through, but I wish he had substituted one of the several *carnivorous* dinosaurs for the sacred Triceratops, because the latter is known to have been a vegetable feeder. *Tyrannosaurus rex* would have been a good one (and darned hard to escape from in close quarters!) However, I believe the fundamental idea was that the Triceratopsians worshipped their own progenitor and therefore we can afford to stretch a point. In conclusion, I wish your magazine all the success in the world, and am doing everything in my power to promote interest in the scientific marvels of the future. "What man can imagine, he can do" is one of the truest sayings we have, and publications like WONDER STORIES and its *contemporaries stimulate men's minds to constructive thought* that is bound to result in real progress made in invention.

Grant V. Wallace,
1964 Marin Avenue,
Berkeley, California.

(Now we have two sides to the question—Juve and Repp—pro and con. Who is right? Are they good or not? And if so, why?

Personally we like them both—tho they have different styles and different methods of telling a story. We thought that "The Annihilator Comes" of Repp and the Neptune stories of Juve were crackerjacks. In the Neptune stories Mr. Juve gets in a lot of sly humor that we never thought him capable of. Now we'll know what to expect from him.—*Editor*)

He Praises Himself

Editor, WONDER STORIES:

Even though the October issue reached us late, the high quality of the stories highly compensated for it. The October issue was one of the best I've read.

In order of merit, I placed the stories as follows:

1. "Lizard Men of Buh-lo."
2. "War Lord of Venus."
3. "Marooned in Andromeda."
4. "Empire in the Sky."
5. "Faster than Light."
6. "Man who Laughs."
7. "City on the Cloud."

Francis Flagg's latest time travelling story for surpasses all others. It is peculiar however that he praises himself in "Lizard Men of Buh-lo" for he says..... "the story 'Machine Men of Ardathia' shows real literary merit. As a matter of fact Mr. Flagg himself wrote the "Machine Man of Ardathia."

Regarding the new change in size. *It is fine with me*, and you give read good reasons for so doing. However, are you going to change the size of the QUARTERLY and Amazing Detective Tales to 7" x 10" also?

The November issue will be a success, with Campbell, Bridge and Starzl in it. By the way—are Frank J. Bridge and Frank J. Brueckel the same person? His "War Lord of Venus" is great. What happened to Paul? The October issue gave us only three of his wonderful illustrations. Marchioni is also good, but Paul is better.

E. Anderson,
1765 Southern Boulevard
New York, N. Y.

(You see, one of the advantages of being a writer is that you can say what you want. We notice for example that both Mr. H. G. Wells and Mr. Bern-

(*Continued on Page 762*)

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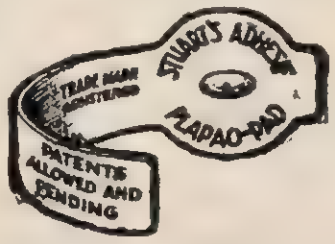

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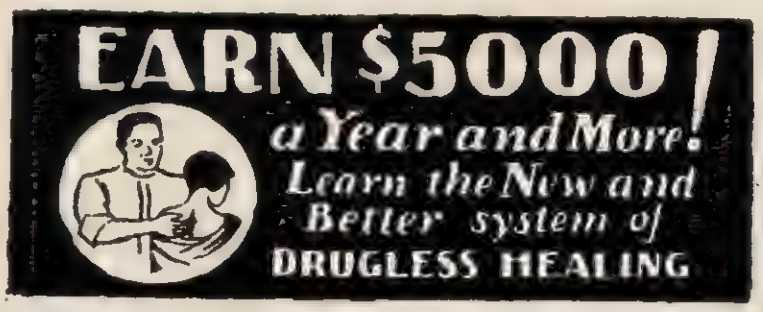

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THE READER SPEAKS

Continued from Page 761

ard Shaw often speak about themselves, and generally they have a rather high opinion of themselves. Since no one took the trouble to class Mr. Shaw with Shakespeare, he did that for himself, and now people are getting to believe it. Naturally there is such a thing as modesty but we doubt if Mr. Flagg overstepped it much. But the question of greatest importance is: was he right? If not he should be brought to account.—*Editor*)

Women Did Not Want to Kill

Editor, WONDER STORIES:

In reply to Mr. Kirshner's letter in the August issue of *WONDER STORIES*, I wish to say that everything that Mr. Kirshner said was wrong. Here is my answer to the first. The women did not want to kill the men till they had learned how to produce life artificially. The second, Dr. Keller has shown that gas could not reach the termites, and the bombs were of no avail. Also the people were not prepared for any invasion, and so could not have time to get together and fight. Besides, a gun would not have had any effect on twenty-foot insects. Third: Brunton was smarter than Mr. Kirshner thinks. He had other plans besides killing the dwarfs all at once, also he wanted to study them for a while.

I close wishing all luck to *WONDER STORIES*, and hoping that I have answered Mr. Kirshner satisfactorily.

Joseph Greenfeld
The Scientific Fiction Library Ass'n
1487 First Avenue, N. Y. C.

(We are very glad to note the existence of the Scientific Fiction Library Association. Such clubs cannot help but promote a better understanding of the purposes of science fiction, to gather men and women in neighborhoods together, to read and discuss stories and generally make a happier time of it for everyone. We wish the Association the best of luck, and invite them to call on us for any help or advice we can offer—*Editor.*)

Wants Science Books

Editor, Wonder Stories:

As a reader of your excellent stories I have become interested in science, so much so that I would appreciate a list of books on physics and other sciences.

I want especially ones written so that a layman can understand them—books that deal with rays, color, heat, light, etc. Books that will give the sort of information that you gave to Mr. Ackerman on page 573 of the Summer *WONDER STORIES* Quarterly.

D. V. Wade,
129 E. 106 St.,
New York.

(An excellent book that covers a general survey of physics as well as giving a survey of the world, matter, evolution, etc., is "Modern Science" by J. Arthur Thomson, published by G. P. Putnam Sons, New York. This book sells for $3.50.

Another excellent book is "Foundations of the Universe" by M. Luckiesh published by D. Van Nostrand Company, of New York. This is part of that company's "Library of Modern Sciences" series. We suggest therefore that in addition to these books, a note be dropped to the Van Nostrand Company asking them for other books that fill the specific needs. —*Editor.*)

Wise and Judicial

Editor, Wonder Stories:

Congratulations! At last you've cut down the format of the magazine. Of course, as you say, the contents will be the same, and improvements will be made to help us all.

Since the combination of "our" two mags, "Air and Science," no move on your part has been so wise and judicial as the present one. The new magazine is to be more convenient to carry, more easily read and handled. I can't wait till I get my hands on it.

I want to cast my vote for course No. 1 as suggested by Mr. Rosenthal. This course is to keep as

THE READER SPEAKS

much romance as possible from your magazine. If you only keep the magazine the way it is, you have the right amount of romance.

I would like to comment on some of the stories, but I can express everything by saying that the stories are the best kind I have read, everything is done in a top-notch fashion.

Your authors are wonderful. Get some more stories by R. F. Starzl. He is one of the best coming writers.

Herbert Goudket,
707 Jackson Avenue,
New York, N. Y.

(By this time Mr. Goudket should already have his hands on the new format *WONDER STORIES*. Drop us a line and tell us what you think. The reports coming in from the November issue are uniformly favorable, many of the readers expressing surprise that the new size could be made so readable.—*Editor*)

Old Shoes and New Suits

Editor, WONDER STORIES:

You have received many letters from older folks telling of their likes and dislikes in your magazine, so I have decided to have a say in it.

I am a high school senior, 16 years old. I have read Wonder Stories for some time and have compared it to other science fiction magazines on the market. There's just as much difference between them as there is between last year's shoes and a new suit. I have finished reading your October number. I have compared it with the January 1930 issue and I think that the magazine has improved considerably in the ten issues.

But there is one thing lacking: I wish you would have some stories of chemical discoveries or inventions instead of the usual interplanetary and time traveling stories.

I would be glad to write to anyone on this subject whether he or she is older or younger than myself.

Francis S. Houghton
22 Central Street,
Auburndale, Mass.

(Mr. Houghton's comparison of our magazine with others is very apt. But he did not explain—which is which? Are we the old shoe?

One of our authors explained the situation to us. "Some of the science fiction magazines," he said, "read like technical textbooks, or the record of laboratory experiments. And some read like a new type of Wild West story. But your magazine is in between these two types; it has plenty of action and adventure, yet the action never becomes cheap. It has a good background of science yet the science never becomes boring." We hope he is right.—*Editor.*)

Editor, WONDER STORIES:

Sending the Good Word

Personally and in behalf of "The Scienceers," I wish to thank you for the very kind notice you gave our organization in the November issue. We can best show our appreciation by continuing our efforts to popularize science fiction and its leading representative, *WONDER STORIES*.

Incidentally, "The Scienceers" is rapidly assuming the status of a national organization. A new branch has been formed in Temple, Texas, by Gabriel Kirschner of that city.

All our members approve of the recent change in size, and consider it a great advance. The present appearance and make-up of the magazine are vastly superior to the former. Marchioni's illustrations are excellent.

The best story of the year, according to a vote taken by "The Scienceers," was "A Rescue from Jupiter," by Gawain Edwards. Honorable mention was given to: "The Infinite Brain," "Before the Asteroids," "The Land of the Bipos," and "The Incredible Monstrosity." Remarkable as these stories were, we are confident that you will surpass them during the coming year.

Allen Glasser,
Secretary, The Scienceers.
1610 University Avenue,
New York, N. Y.

(To "The Scienceers" particularly, we want to send out the good word. We understand that a sequel to the "Rescue from Jupiter" is on the way, and in the author's own words, "it surpasses 'The Rescue' by

(*Continued on Page* 764)

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THE READER SPEAKS

Continued from Page 763

far." Mr. Edwards is author of "The Earth Tube" published by D. Appleton & Co., New York, and we understand that the book has received very favorable reviews throughout the country. It is also a science fiction story, telling about an invasion of the west by means of a gigantic tube bored through the earth. It is a tremendous theme and Mr. Edwards gives to it the same realistic yet imaginative treatment that he gave to "The Rescue from Jupiter."

The favorable reception afforded the new size WONDER STORIES was practically unanimous. Now we *can continue to go on*, as Mr. Glasser says, *to* "surpass" our stories during the coming year.—*Editor.*)

Would His Watch Be Slow?

The publishers of WONDER STORIES are to be congratulated upon the improvements made in the *magazine during its second year.* The latest issues were the best we have had, and although I was one of those who had some misgivings about the "merger" with "Air Wonder Stories", I am not sorry that it was done. The paper used is of a better quality, and the stories are all superior. The one fault I still find with *WONDER STORIES* is in the binding. Despite the utmost care the covers insist upon coming off. I think the trouble can be remedied by using more glue, and we would then have a stronger binding. What has happened to Paul? I find only two of his illustrations in the entire magazine.

I have a little suggestion to make. In the last number of each volume print an index of all the stories, authors, and editorials that appeared in that volume. That would come in very handy to those of us who frequently go over some old numbers for reference. For instance if we wanted to reread or find a fact in some story by Harl Vincent but didn't know the name of the story we would look under Vincent where it would tell all the stories he had that year. The September editorial could be listed under "Space-Matter." *What do you think of the idea?*

Will you please answer a question which has been puzzling me for some time. It is on the Fitzgerald Contraction theory. If a man whose watch was correct traveled at a very fast speed for about a day at the end of that time would his watch be slow?

Allan P. Stern,
2995 Lincoln Blvd.,
Cleveland Heights, Ohio.

(The suggestion for an index is a good one. We believe that something can be done with it. Inasmuch as the volume ends with the May 1931 issue, we will have an announcement on it some time before that.

The whole Lorentz-Fitzgerald Contraction theory is much more complex than it sounds. The "contractions" that take place are based on a motion of one body with respect to a body at rest. Inasmuch as we have not yet discovered any body at "absolute" rest, the contraction formula is applied to relative motion. In other words, if the man with the watch is on a swiftly moving train (moving with reference to the track or embankment), the embankment may also be considered to be moving with reference to him.

Now, if he were moving very swiftly, and while in motion tried to associate his own scale of miles and minutes with that of a man on the embankment, he would find that his miles were shorter and his minutes longer, in other words his watch would appear to be slow.

Yet if the man on the embankment were to have a watch and associate *his* miles and minutes with those of the man on the train, his own miles would appear *to be smaller and his own minutes longer and his* watch would appear to be slow. But when the motion *of the man on the train ceased and the two men* were once more at rest with each other their watches would read the same.

Dr. Breuer in his "Fitzgerald Contraction" did not really mean that in actuality people would travel

(*Contiued on Page 765*)

THE READER SPEAKS

Continued from Page 764

through several hundred thousand years in a few minutes. They really traveled for several hundred thousand years; but their time with reference to time outside would appear to move very slowly.

The important thing to remember when speaking of contraction in the theory of relativity is that either body may be considered to be the one to be moving and contracting with reference to the other, and that the contraction is not actual but apparent.—*Editor.*)

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of WONDER STORIES published monthly at New York, N. Y., for October 1, 1930.

State of New York }
County of New York }

Before me, a Notary Public, in and for the State and County aforesaid, personally appeared Irving Manheimer, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the WONDER STORIES, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Stellar Publishing Corporation, 98 Park Place, New York.

Editor: Hugo Gernsback, 98 Park Place, New York.
Managing Editor: David Lasser, 98 Park Place, New York.
Business Manager: Irving S. Manheimer, 98 Park Place, New York.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publicatons only.)

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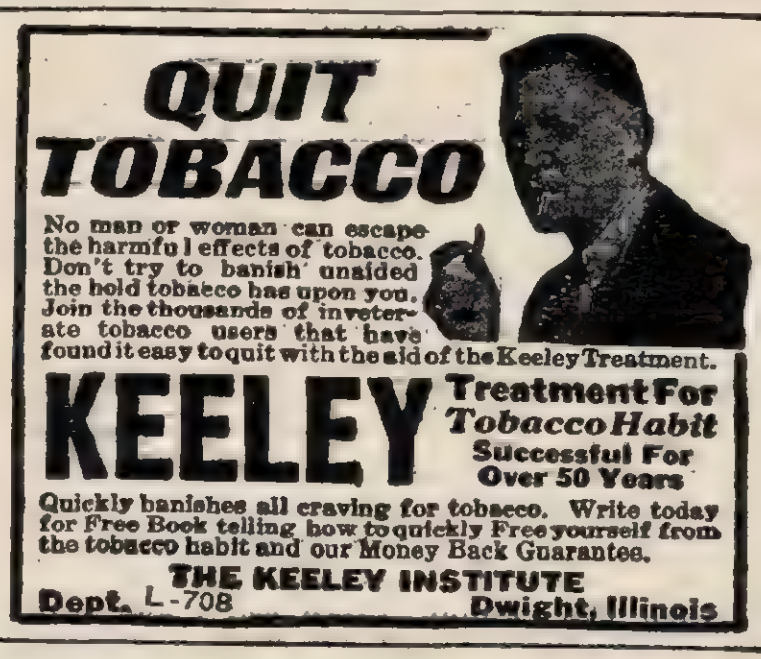

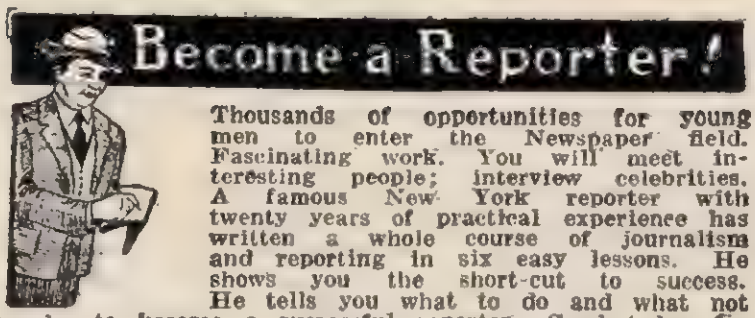

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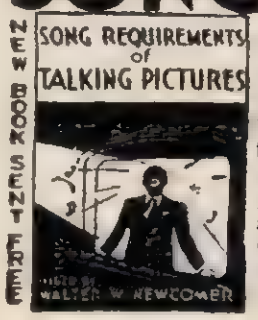

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BOOK REVIEWS

THE WORLD IN 2030 by The Earl of Birkenhead, 208 pages, stiff cloth covers, size 5½ x 8½. Published by Brewer and Warren, New York. Price $3.00.

It is rare that a man in such a distinguished position as the late Earl of Birkenhead occupied will risk his time and reputation on prophecies of the future. Men of eminence are quite satisfied with themselves, generally, if they can guess accurately the events of the coming year or two, without attempting to predict the occurrences of the next century.

The present book has a great deal of interest in that it represents an opinion of the world of 100 years hence, of neither a writer nor a scientist but one of the most eminent of the English Conservatives, and a leader of the English Bar. The author admitted in his book that a better scientific background would have aided him immensely in his task; but it is evident that he has wisely made up for his own shortcomings by consulting authorities in the fields he wrote about.

To readers of science fiction the book should have a peculiar interest, for it will enable them to check the predictions of science fiction authors with that of one of the sanest, most conservative men of the day. Science fiction does not suffer thereby—in fact the late Earl may be suspected of having dipped liberally into men like Wells, Verne and Edward Bellamy, and perhaps others known more intimately to readers of *WONDER STORIES*.

Conscious all the time of the critical appraising eyes of his contemporaries on his work, the Earl was content to stick close to the predictions that are quite conservative. In many of them, it strikes the reviewer, he does not make use of a sense of time values, and the changes that should occur over the next fifty years, he places as occurring in not less than a century. Some of his conclusions are worth quotation.

Speaking of war in 2030, he sees great masses of mechanically operated engines, such as tanks, controlled by wireless. "Hence," he goes on to say, "the contending armies of tanks may be able to go into battle entirely unmanned; and the issue of the day will be decided by two men, each of them directing his country's entire armament."

A completely synthetic diet is a probability of the next century. "Synthetic foods will be cheaper, more palatable, more various, perhaps more hygienic than their predecessors. By the year 2030, synthetic bread, sugar and vegetables may be cheaper than water today."

Like Henry Ford, the Earl sees that at last relief from burdensome toil is in sight for the laboring man. "It will not be often that his one day a week will be made laborious by specially hard work; superintending the operations of giant machines of two hundred years hence will be supremely easy and supremely dull."

He foresees too, a world in which science and scientific thought will dominate the minds of the masses of the people, "as thoroughly as Roman Catholic thought dominated the Middle Ages." We will be able to use scientific judgment in casting our votes on great national problems, and advertisers will use a real established science of psychology to compel us to buy their goods pictured in their hypnotic advertisements.

We will be less emotional than we are now, in fact "judged by our (present) standards, the man and woman of 2030 will seem harsh and unemotional."

On the question of interplanetary travel the Earl is quite discreet. He is sure that by 2030 attempts to reach the other planets will have been made, and that several expeditions will perish before one succeeds. Yet the perils are such that he personally did not wish to risk himself on a trip.

We see through the eyes of the author, a world in which many of our problems, economic, social and industrial will have been solved by the scientist. Man freed from toil will devote himself in his leisure to intellectual pursuits. By cooperative effort war may be averted, but if it comes it will probably be less awful than the last. It will probably come to a quick and devastating end, but the conquerors will be wise enough not to cripple too much the man and industrial power of the defeated.

BOOK REVIEWS

THE DAY OF THE BROWN HORDE by Richard Tooker, 309 pages, stiff cloth covers, size 5 x 7¾. Published by Payson and Clarke, Ltd., New York. Price $2.50

Novels dealing with the struggles of prehistoric man on our earth are quite rare, possibly because they need for their writing a combination of qualities not often found in one man. For that reason, the present book is quite welcome.

Mr. Tooker gives us in this story of a savage tribe of troglodytes who inhabited California at "an unnamed" date a story not only of human struggles against nature but also the greater struggle of a race against its environment.

It is in his ability to make his half-human characters real and associate them with us and our own lives that gives this book such a gripping quality. We find here in the childhood of our race, the signs of heroism, self-sacrifice, yielding to superstition, rising above circumstance—a pictorial study of the seeds of humanity.

There are cataclysmic upheavals in which man bows down before the great brute forces of nature, and on the other hand in the mother's marathon through a forest to a new refuge in the barren uplands we get a dynamic account of the power of will over physical difficulties and natural obstacles.

The book has both an epical sweep and a personal poignancy. It is heartily recommended.

THE PURPLE CLOUD by M. P. Shiel, 290 pages, stiff cloth covers, size 5¼ x 7¾. Published by Vanguard Press, New York. Price $2.50

Mr. Shiel wrote and published this strange science fiction story in 1901. It is rather a tribute to it, therefore, that the publishers saw fit to revive it in a day when many of the bases of the story have been destroyed by the march of science. However it is a good yarn, well told, many of its sections gripping one with a feeling of inutterable despair, and even transmitting *to the reader part of the madness of the solitary hero.*

An expedition sets out for the North Pole to win a prize of $175,000,000 to the first man to set foot on the pole. Naturally this is before the day of the airplane, and the expedition fights the elements with schooner, dog and sled. Our hero leaving behind his fiancee who has admonished him to "Win for me" leaves his companions in the dead of night, near the pole, and make the final dash alone. He returns to find a dead world, people sitting or reclining at their usual occupations struck dead by some mysterious force. Newspaper clippings and other records reveal that a purple cloud of cyanogen gas had gradually spread over the earth to gather all living things into its deathly fold. The chapters by the way that recount the scenes found by the hero as he makes his way from the Pole back to London, are the best of the book.

Alone in the world, with corpses on every hand, madness gradually seizes him. He works for seventeen years to build a palace of gold and a great lake of wine, and then abandons his work to rush off to China, for he has a feeling that a living being still exists there. But at the end he does find a young girl alive and they create a new race.

There are touching, ironical, bitterly satirical as well as penetrating scenes in this strange book. Many of the passages however are drawn out unduly long, but as a whole the book holds one's attention; and for science fiction fans it is certainly worth reading.

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